THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
August 10, 1987 · Vol. XXI · No. 32 · $2/Copy · $44/Year

COMPUTERWORLD

INSIDE

Spotlight — Users face up to the task of reconciling relational and traditional DBMS technologies. Pullout section.

In Depth — Plotting cost vs. benefits: End users get in on the act. **Page 59.**

Canaan's vanishing act vexes

BY STANLEY GIBSON
CW STAFF

Worried because he had not heard from his hardware supplier in more than six weeks, Tony Bye, the Great Britain distributor for Canaan Computer Corp., flew to the firm's Trumbull, Conn., headquarters several weeks ago. He found Canaan's factory locked shut, with a sign on the door saying the computer maker was no longer in business.

The experience was a rude awakening for Bye, who had received no formal notice from Canaan management that the company was going out of business. "We just heard by word of mouth," said Bye, who is managing director of Databench Ltd. in Marlow, England.

He later discussed the situation with Canaan distributors in West Germany, France and Belgium and found they were all likewise in the dark.

Where'd everybody go?

Canaan, which was founded in 1981 and has received some $30 million in venture capital, slipped almost out of existence in recent months, apparently without telling many of its OEMs or customers. Several said they are confused and angry over what they called the silent disappearance of the minicomputer maker.

Canaan's investors, led by Hambrecht & Quist, Inc., have been scrambling to pay off debts and now say they are in the process of belatedly notifying customers.

IBM's announcement of its 9370 departmental processor, which competed directly with Canaan's VM-based minicomputer, sapped Canaan's market appeal as a departmental processor.

Continued on page 4

9370 hits the ground running

Large-volume shipments should push IBM mini past sales target

BY JAMES CONNOLLY
CW STAFF

IBM's goal of selling 5,000 of its 9370 mid-range systems by year's end appears within reach as the minicomputers gain a foothold as distributed processors in major corporations, according to several IBM observers.

Analysts tracking early 9370 shipments and users' buying intentions reported last week that IBM's projection for the last six months of this year is realistic and predicted that IBM will sell 15,000 to 30,000 of the minicomputers during each of the next few years. Only a few of the early shipments have been replacements for IBM 4361 or 4331 systems, with the balance being used in pilot programs for major 9370-based MIS applications.

In addition, one analyst said, IBM will soon release several major corporations from nondisclosure agreements as it announces a half-dozen or more orders, each for 300 to 400 9370s.

That analyst, Kimball Brown of San Jose, Calif., research firm Dataquest, Inc., added that key 9370 accounts are being handled by IBM's Federal Systems Division.

"The wraps are going to come off in August," Brown said, noting that IBM is expected to free customers such as Ford Motor Co. and United Airlines from two-year nondisclosure agreements.

"What is going to happen is

Continued on page 6

DEC again rewrites price tags

BY DAVID BRIGHT
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. restructured its pricing last week for the second time in five months, raising the prices of high-end VAX 8000 systems while cutting the costs of smaller models.

Analysts said the move sets the stage for next month's scheduled introduction of the Microvax III system.

DEC also reduced the prices of its older PDP-11 line by an unspecified amount, dropped the price of the Microvax 2000 workstation by 17% to 20% and increased the price of "the balance" of its hardware and software products by less than 5%, according to a statement. DEC did not answer requests to specify the products affected.

Although DEC has lately been making low-end prices more attractive, the company has simultaneously increased high-end prices. Analysts suggested that this latest restructuring could be a response to the recent start of 9370 system shipments by IBM.

At the same time, DEC announced lower cost memory modules for the VAX 8000 systems that use 1M-bit chips to in-

Continued on page 93

Fortune 500 slowly warming to PS/2

BY ED SCANNELL
and ALAN J. RYAN
CW STAFF

IBM's Personal System/2 series has made inroads into Fortune 500 companies, but concerns over its unproven technology and the lack of an advanced operating system are stalling some purchasing plans, according to MIS managers at more than a dozen Fortune 500 companies who were interviewed last week.

Managers also said the machines are not causing them to scale back plans to buy IBM Personal Computer-compatible systems.

The interviews indicated that firms that have placed significant orders are, for the most part, airlines and insurance companies

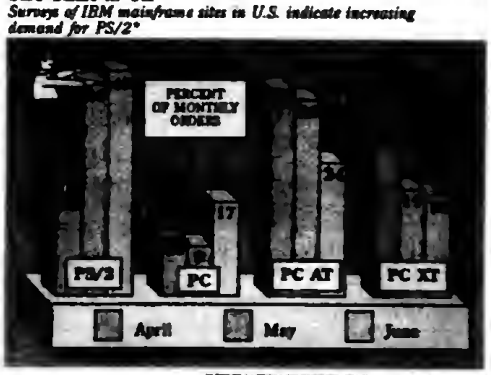
...t plan to resell PS/2s — espe-
...ly Model 30s — to affiliated
...anizations. Other Fortune
0 companies said they are hesi-
...nt and plan to purchase be-
...een 50 and 200 systems dur-
...g the remainder of this year as well as a sizable quantity of compatibles.

"We're committed to [the PS/2] as a product, as opposed to ordering IBM PC ATs," said Daniel Cavanagh, senior vice-president of MIS at Metropolitan Life Insurance Co. in New York. He added, "That doesn't mean we would stop buying plug-compatible equipment" as PS/2 clones become available.

Continued on page 8

The shift is on

Surveys of IBM mainframe sites in U.S. indicate increasing demand for PS/2

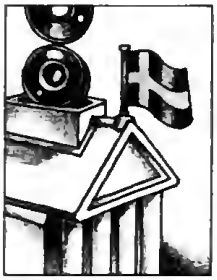


INFORMATION PROVIDED BY FOCUS RESEARCH, INC.
CW CHART: MITCHELL J. HAYES

IN THIS ISSUE

Building bridges. "It's a mainframe-class product on a micro," one insider says about Unisys's Ally, a 4GL based on reusable code aimed at the Unix and MS-DOS worlds. The initial release will support Oracle's relational DBMS and Dbase III. Page 10.

Brushup. ADR upgrades Datacom/DB, its relational-like DBMS, to take advantage of MVS/XA, reduce CPU utilization time and trim response time. Page 93.



Sweden's S.E. Banken bets on MIS. Page 63.

Quotable

"It was a very powerful and effective machine. The whole thing's a tragedy."

TONY BYE
DATABENCH LTD.

On Canoan's demise. See story page 1.

Congressman, GSA spar over federal net plan

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The federal government's effort to acquire an upgraded private network called Federal Telecommunications System (FTS) 2000 was thrown into turmoil last week. A key member of Congress challenged the government's entire approach to the $4.5 billion procurement just a few weeks before bids are due on Aug. 31.

Rep. Jack Brooks (D-Texas) urged the General Services Administration (GSA) to completely restructure the contract so that it can be awarded to multiple vendors rather than follow the winner-take-all approach of the current procurement.

GSA Administrator Terence C. Golden rejected Brooks' suggestion, a spokesman said, and the GSA is proceeding on its original path. The agency is said to believe that a single-vendor network would be cheaper, because of volume discounts, and easier to manage.

In response to Brooks' criticism, GSA officials emphasized that the 10-year contract can be terminated and opened for a new round of competitive bidding after four years if any problems develop.

Explosive action

Brooks, the tenacious chairman of the House Committee on Government Operations, could still torpedo the GSA's FTS 2000 strategy through oversight hearings and legislation.

"If Brooks beats them about the head and shoulders and prevails . . . then that would be a total abort," said Whit Dodson, research director for International Data Corp.'s Washington Division. Dodson explained that the multivendor approach would be such a major change that the GSA would have to terminate the current FTS 2000 procurement and start over.

The GSA wants to replace its outdated intercity network for federal agencies — the largest private network in the world — with an integrated voice and high-speed data network called FTS 2000.

Brooks, concerned that the government will be locked into a single contractor for the 10-year life of the contract, wants it to be split on s 70%-30% basis between two vendors and rebid every three years to determine which vendor gets the bigger share.

But Martin Marietta Corp. threatened to pull out of the bidding if the procurement is changed to meet Brooks' demands. Martin Marietta is bidding for the contract as leader of a team that includes MCI Communications Corp. Martin Marietta opposes changes that break the contract into pieces, a spokesman said.

AT&T, the only other bidder, does not oppose the Brooks proposal. An AT&T spokeswoman said the carrier is preparing its bid for the current procurement but considers Brooks' multivendor approach an acceptable one.

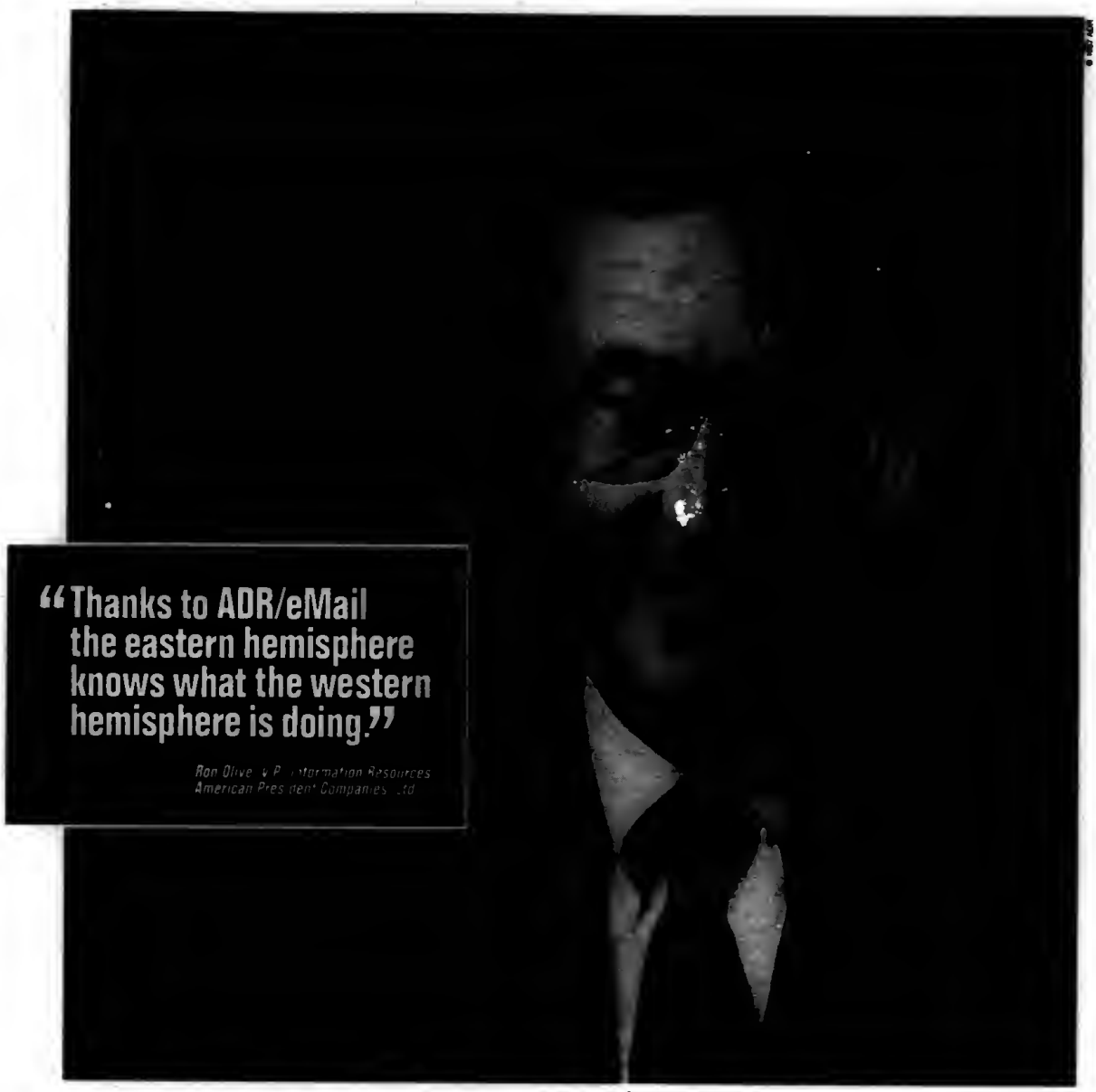
The FTS 2000 procurement has also run into several other problems in the last few weeks:

- AT&T charged in federal court that the regional Bell holding companies have promised to provide the Martin Marietta team with interexchange services that are prohibited by the court order on AT&T divestiture. The Bell companies denied the accusation, calling it an AT&T ploy to knock out a competitor.
- The GSA contract officer for FTS 2000 was recently replaced, sources said, because of a possible conflict of interest.
- The Federal Communications Commission turned down a GSA request that the FTS 2000 carriers be exempt from common-carrier rate regulation. But the GSA, which wants s fixed-price contract, said it was satisfied that the ruling will allow the carriers to file fixed-price tariffs.
- The U.S. General Accounting Office reported that the GSA's initial decisions concerning FTS 2000 were made without adequate analysis.

CORRECTIONS

Computer Solutions, Inc. was inadvertently omitted from the Spotlight MRP II software chart [CW, July 6]. Its product, Growthpower, contains 16 modules such as financial, manufacturing (including manufacturing resource planning) and marketing. It runs on the Hewlett-Packard Co. 3000 series, includes real-time updating for all transactions and an integrated accounting/financial system. A typical system sells for between $40,000 and $75,000. The company's phone number is (617) 229-2200.

Data 3 Systems, Inc.'s MRPS 38-S and MRPS 38-P MRP software are based on both net and regeneration logic and offer relational data base features. The MRPS 38-S has 260 U.S. site licenses; the MRPS 38-P has 10 [CW, July 6].



Staying ahead of the competition today takes a company with quick reflexes. And the best way to improve your company's reflexes is to improve its communications.

That's why hundreds of companies like American President Companies, Ltd., The Country Companies and Emery Chemicals use ADR/eMAIL.®

American President relies on ADR/eMAIL to keep its customer's shipments on schedule. ADR/eMAIL exchanges vital information between 4,000 employees at more than 100 locations throughout North America and Asia.

Communicating with ADR/eMAIL is better than by telephone or telex. ADR/eMAIL makes sure urgent messages get priority treatment by organizing them in priority order. And by letting people preview their messages before they read them.

ADR/eMAIL is also easy to use. Because ADR/eMAIL understands everyday business language. No matter what language you conduct business in.

And ADR/eMAIL is easy to install and maintain. Most companies already have everything ADR/eMAIL needs—an IBM mainframe, CRTs, 328x printers, PCs and TP networks.

To find out how easy it is to give your company this world-class electronic mail system call 1-800-ADR-WARE.

ADR PERFORMANCE SOFTWARE.
Unlock the potential.

Ameritech Official [illegible]
for the Tenth Pan Am[illegible]
Indianapolis 7 2 1 A[illegible]

ADR
AN AMERITECH COMPANY

Applied Data Research, Inc. Orchard Road & Rt 206, CN-8, Princeton, NJ 08540 1-201-874-9000.

Borland set to challenge 1-2-3

Users impatient for Lotus upgrade say Silicon spreadsheet a contender

BY STEPHEN JONES
CW STAFF

SCOTTS VALLEY, Calif. — Borland International President Philippe Kahn is expected to announce today that Borland is developing a spreadsheet that will go head-to-head with the venerable Lotus Development Corp. 1-2-3 in the corporate decision-making software market, sources close to the company said last week.

The product, which has been beta-tested at sites such as Price Waterhouse and GTE Corp. for the last three weeks, offers a soft interface that can be customized by the user.

It can also read and write files from 1-2-3, Microsoft Corp.'s Multiplan and Computer Associates International, Inc.'s Supercalc. While Borland has emphasized that the software is still being developed, sources said the company has guaranteed delivery by year's end.

Expected to be priced between $200 and $300, early versions of the offering have scored points with some users who until now have relied primarily on 1-2-3. Version 2.01 of 1-2-3 is currently listed at $495.

"I'm very impressed with it; it's more intuitive than 1-2-3, but it's similar enough to feel like you're running a Lotus program," said Don Smith, a partner with Price Waterhouse in Chicago who acts as the firm's coordinator of microcomputer consulting.

Grab market share

If the product takes off, it could help Borland grab a chunk of Lotus's share in the market for microcomputer business decision-making tools.

That fits in with the philosophy of the expansion-minded Kahn, who last month guaranteed Borland a foothold in the data base management business by gobbling up Paradox publisher Ansa Software.

Sources, who asked not to be identified, said months of speculation about the Borland spreadsheet will end today when Kahn releases a formal statement about the product. Kahn could not be reached for comment.

Known as Silicon, the spreadsheet's strongest point might be the graphics and charting capabilities it produces using IBM's Enhanced Graphics Adapter. Features include three-dimensional images and exploding pie charts. One user reported the ability to change fonts and make slick-looking charts without the bother of going into a graph package.

'Beats Lotus hands-down'

One tester, who has been using 1-2-3 for the last four years, said Silicon's sharp graphics features "beats Lotus hands-down."

He added that the program has about 500 pages of detailed documentation that is easier to read than earlier product manuals from Borland such as Reflex.

The product also recalculates spreadsheet updates faster than 1-2-3 because it picks out only those numbers that have been changed and ignores the rest during recalculations, testers said.

Integrated graphics, meanwhile, are reported to accommodate the Paradox and Reflex data bases.

Silicon's high functionality could fill a void for users who have grown impatient waiting for long-rumored enhancements of 1-2-3 Release 2.0.

"As we add additonal spreadsheets and wait for Lotus's enhancements, we'll strongly consider the Borland product," Smith said. "The added graphics capabilities are something we always wanted and will certainly use."

Why another one?

But some industry watchers are less enthused about the pending product, with one microcomputer dealer from the Midwest asking: "Why does the world need another spreadsheet? All of corporate America is trained on 1-2-3."

And others questioned whether Borland could win in a David vs. Goliath battle with Lotus. "Frankly, I think Borland could be spending its money better," said Bruce Johnston, a senior analyst with First Boston Corp. in New York. "It seems that Philippe is intent on taking on the big boys, and that's going to be tough."

Despite its early inroads into Microsoft's share of the languages market, Johnston said Borland would be better off targeting niches in the microcomputer software business in which the likes of Lotus and Microsoft are not to be found. Selling low-cost programs into such niches helped the $280 million company gain initial success as a start-up in 1983.

Vanishing act

FROM PAGE 1

Several rounds of layoffs led to a restructuring period in May in which two Hambrecht & Quist officials, Michael Preletz and Jerry Burk, took over the reins of the company.

All employees dismissed

About eight weeks ago, virtually all remaining employees were dismissed, and on July 6, an eviction order was executed on behalf of Canaan's landlord, according to the records of the Superior Court in Bridgeport, Conn. Subsequently, some 300 to 400 computers plus peripherals were moved to a Bridgeport warehouse, according to an employee of the storage company. Two weeks ago, Hambrecht & Quist put Richard Rifenburgh of the firm's Boston office in charge of what remained of Canaan.

Rifenburgh has since relinquished control of the company's assets to Accent Systems Corp. in Pittsburgh. In an agreement currently being finalized, Accent will service the installed base of Canaan systems and perhaps sell systems from inventory in the hope of paying off Canaan's creditors, according to Rifenburgh, who is currently chairman of Canaan. Scott Os, an Accent executive, is serving as president.

Now, Canaan has arranged with its landlord to regain possession of its machines and is in the process of shipping them to Accent, according to Rifenburgh. As of last week, Bye said, he had still not been informed of Canaan's condition.

"We're now faced with the challenge of maintaining them [Canaan computers]," he said, indicating that he has been attempting to obtain old Canaan machines to support his user base of five customers. Databench had sold the system with a project management software package. "They run very well. It was a very powerful and effective machine. The whole thing's a tragedy," Bye said.

Left in the dark

Other users and distributors echoed Bye's account of having been left in the dark by Canaan, Hambrecht & Quist and Accent Systems.

"It boggles my mind. The big disappointment was that we would have expected Canaan to notify the installed base. I didn't hear from Accent, either," said Spike Kasper, president of Norwalk, Conn.-based Document Systems, Inc., which is leasing a Canaan DCS 6100 system and using it for development. Kasper said he has contacted Accent personnel on his own and that he has attempted, without success, to speak with Hambrecht & Quist personnel.

Kasper said he had hoped that Canaan would eventually market his firm's product, a mainframe-based document text storage and retrieval system. Document Systems will now develop solely for IBM's 9370, he said. Kasper expressed surprise and disappointment at Canaan's fate. "Their system did what it said it would do. I can't figure out why they weren't able to capitalize on the 9370 market," he said.

"They were remiss, not notifying us," said another user, who asked not to be named. "We have had no information from Canaan or Accent. We heard about it through the grapevine." The user, who has been running two Canaan processors for about one year, added, "We kind of like the system."

Rifenburgh told *Computerworld* that he is in the process of informing Canaan customers "as fast as humanly possible."

"Customers have every right to be unhappy," Rifenburgh said. Formerly treasurer and a venture investor in Accent Systems, Rifenburgh joined Hambrecht & Quist eight weeks ago.

Accent was created in November 1985 to service the workstations of Perq Systems Corp., a company that had just ceased operations. Since then, Accent has been paying off Perq creditors with maintenance revenue — much in the manner in which the company plans to pay off Canaan's bills.

Ron Ritchie, who was president of Canaan for more than a year, until May, attributed Canaan's demise to IBM's 9370 departmental computer. Canaan would have brought its product to market in time to fill a need for IBM 370-type mid-range processors, be said, "if IBM had not preannounced the 9370."

Ritchie agreed with the notion that IBM "validates" a market by announcing products for it, but he added that the market is only fertile for competitors after IBM ships products — not before. He pointed to the IBM Personal Computer clone market as an example.

Overly optimistic

Another employee said Canaan lost 18 firm orders on the day the 9370 was announced. He added that Canaan made the mistake of building processors based on overly optimistic sales projections. When orders were canceled, Canaan was left with the processors in inventory.

Another former Canaan employee said Canaan had installed 30 to 40 systems in the U.S. "Between the revenue from systems and maintenance, I believe they could still cover all the debt," he said.

The company had reportedly received more than $30 million in venture capital investment from Hambrecht & Quist and other investors, including General Electric Venture Capital Group and Alan Patricof Associates.

COMPUTERWORLD

Editor in Chief
Bill Laberis
Executive Editor
Paul Gillin

Senior Editor
Peter Bartolik
Senior Editors
James Connolly, Systems
Clinton Wilder, Industry
Elizabeth Horwitt, Networking
Charles Babcock, Software
David Ludlum, Management
Douglas Barney, Microcomputing
Patricia Keefe, Networking
Ed Scannell, Microcomputing
Senior Writers
Rosemary Hamilton, Stanley Gibson
David Bright, Missouery Data Magazine
Staff Writer
Alan J. Ryan
News Production Editor
Suzanne Weixel
Interns
Adam Stone

Features Editor
George Harrer
Senior Editors
Janet Fiderio
Glenn Rifkin
Joanne Kelleher
Amy Sonnenfeld Piore
Associate Editor
Deborah Fickling, Penny Jansen
Assistant Editor
Kelly Shea
Senior Writer
Michael L. Sullivan-Trainor
Researcher
Sally Cusack
Assistant Researcher
Rosie MacKall

Managing Editor
Dawnna White
Chief Copy Editor
Patrice Reed Erickson
Assistant Chief Copy Editor
Steven M. Urkevitz
Copy Editors
David W. Brumley, Mary Grover
Martha E. Rach, Sharon Baker
Laura O'Connell, Marie T. Burke
James Daly

Design Editor
Marjorie Hagopian
Graphics Editor
Mitchell J. Hayes
Graphics Assistant
Amy J. Swenson
Design Designer
P. Clarke Lebescon

Editorial Assistants
Patricia Faherty, Christie Sears
Linda Lampron
Rights and Permissions Manager
Nancy Shannon

News Bureaus
Mid-Atlantic
201/967-1350
Alan Alper, Correspondent
Washington, D.C.
202/347-6718
Mitch Betts, Correspondent
West Coast
415/328-8044
Kathy Chin Leong, Manager
Jeffry Beeler, Chief
Julie Pitta, Senior Correspondent
James A. Martin, Correspondent
Stephen Jones, Correspondent
Midwest
312/827-4433
Jean S. Bozman, Correspondent

IDG News Service
Kathleen A. Gow, Director

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
617/879-0700

Computerworld is a publication of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 80 computer publications in more than 30 major countries. Fourteen million people read one or more IDG Communications publications each month. IDG Communications publications include in the IDG News Service offering the latest on domestic and international computer news. IDG Communications publications include: ARGENTINA'S *Computerworld Argentina, PC Mundo*; ASIA'S *Communications World, Computerworld Hong Kong, Computerworld Indonesia, Computerworld Malaysia, Computerworld Singapore, Computerworld Southeast Asia, PC Review*; AUSTRALIA'S *Computerworld Australia, Communications World, Australian PC World, Australian Macworld*; AUSTRIA'S *Computerwelt Oesterreich*; BRAZIL'S *DataNews, PC Mundo, Micro Mundo*; CHILE'S *Informatica, Computacion Personal*; DENMARK'S *Computerworld Danmark, PC World Danmark*; FINLAND'S *Mikro, Tietoviikko*; FRANCE'S *Le Monde Informatique, Distributique, InfoPC, Le Monde Des Telecoms*; GREECE'S *Micro and Computer Age*; HUNGARY'S *Computerworld SZT, Mikrovilag*; INDIA'S *Dataquest*; ISRAEL'S *People & Computers Weekly People & Computers Monthly*; ITALY'S *Computerworld Italia*; JAPAN'S *Computerworld Japan*; MEXICO'S *Computerworld Mexico*; THE NETHERLANDS' *Computerworld Netherlands, PC World Benelux*; NEW ZEALAND'S *Computerworld New Zealand*; NORWAY'S *Computerworld Norge, PC World Norge*; PEOPLE'S REPUBLIC OF CHINA'S *China Computerworld, China Computerworld Monthly*; SAUDI ARABIA'S *Arabian Computer News*; SOUTH KOREA'S *Computerworld Korea, PC World Korea*; SPAIN'S *Computerworld Espana, Communicaciones Mundiales, PC World Espana*; SWEDEN'S *Computer Sweden, Mikrodatorn, Svenska PC World*; SWITZERLAND'S *Computerwoche Schweiz*; UNITED KINGDOM'S *Computer News, DEC Today, ICL Today, PC Business World*; UNITED STATE'S *Amiga World, Boston Computer News, CD-ROM Review, Computerworld, Computers In Science, Digital News, Federal Computer Week, 80 Micro, PC-CUS Publications, inCider, Infoworld, Macworld, Computer + Software News (Micro Marketworld), Leisure Entertainment Network World, PC World, Portable Computer Review, Publish!, PC Resource Run*; VENEZUELA'S *Computerworld Venezuela*; WEST GERMANY'S *Computerwoche, PC Welt, Run, Information Management, PC Woche*.

OUR CUSTOMERS RESERVE A VERY SPECIAL PLACE FOR OUR SORTS.

In a recent *Datapro* survey our customers put us on something of a pedestal.

They rated our sorts—SyncSort OS, DOS and CMS—in nine categories, including Reliability, Efficiency, Vendor Support, and Ease of Installation and Use.

We're proud to announce that out of a perfect score of 10, our Overall Satisfaction rating was 9.24.

And just listen to the customers themselves: "I wish all systems worked as well." "We can just install it and forget about it." "The only problem we experience is with our users who don't take full advantage of all the features."

If you'd like to feel this way about your sort, call us to arrange for a test on your system. Our number is **201-930-8200.**

To tell the truth, we're even happier being put on systems than on pedestals.

syncsort

THE BEST OF SORTS.℠

IBM shaves prices on 3090s

Upgrades on 300E and 600E also cut less than month after first shipment

BY STANLEY GIBSON
CW STAFF

Less than a month after initial customer shipments, IBM recently cut prices on its 3090 Models 300E and 600E and on upgrades to those machines.

The price of a Model 600E processor unit was lowered by $600,000, from $10,944,000 to $10,344,000, and the price of a Model 300E processor unit was cut by $150,000, from $5,750,000 to $5,600,000. Upgrades to 600E and 300E machines were cut by up to 20%.

The first customer shipments of the 3090 E models were announced July 1. To be eligible for the price cut, machines must have a date of installation or effective date of purchase on or after July 28, according to IBM.

Always count on a cut

"We'll take the $600,000 and say, 'Thank you very much,' " said George DiNardo, executive vice-president of Mellon Bank NA. Mellon is in the process of upgrading a 3090 Model 400 to a Model 600E. "Anyone who didn't figure on an August or September cut was a candidate for the loony bin," DiNardo said, explaining that he always requests a two-month test allowance on new systems or upgrades in order to be eligible for possible price cuts put into effect after the initial shipping date.

Bob Djurdjevic of Annex Research, Inc. said many customers now include such an on-site test allowance clause in their contracts, generally for a period of 60 days. "IBM wants its sales force to focus on these models. They think they have a marketing advantage over Amdahl and NAS," Djurdjevic said, explaining that the controller IBM uses to manage three processors is more sophisticated than the two controllers Amdahl Corp. and National Advanced Systems Corp. must use to manage three processors in their systems.

"NAS and Amdahl will have to redesign their systems controllers to handle three- and six-way systems," he said, adding that he has made no adjustment to his estimates of residual values on the processors as a result of the price cuts. "The price cuts are really cosmetic. It creates a talking point for sales reps."

IBM's upgrade price changes were lowered as follows:

- A Model 300E-to-Model 600E upgrade was reduced from $5,194,000 to $4,744,000.
- A Model 200-to-Model 300E upgrade was reduced from $1,755,000 to $1,605,000.
- A Model 200E-to-Model 300E upgrade was reduced from $1,605,000 to $1,455,000.
- A Model 400-to-Model 600E upgrade was reduced from $3,160,000 to $2,560,000.
- A Model 400E-to-Model 600E upgrade was reduced from $3,035,000 to $2,435,000.

IBM's 9370

FROM PAGE 1

that you are going to see IBM getting a lot of government bids and big commercial bids through the Federal Systems Division. I think there are probably a half-dozen or so of these Ford-type bids that are ready to roll out," Brown said. He explained that the Federal Systems Division has taken charge of many 9370 accounts because of that division's charter as a systems integrator.

Brown contended that the large scale and lengthy term of the division's contracts require IBM to provide products, including the networking and software tools that the 9370's critics have said it lacks, first to the Federal Systems Division and later to the direct sales force.

Brown said only about 500 of the 5,000 shipments for this year are replacements for 4361 type systems.

Meanwhile, George Weiss, an analyst with the Gartner Group, Inc. research firm in Stamford, Conn., concurred that the early shipments are reaching "primarily very large enterprises with the potential for large volumes."

Weiss said the typical buyer has been a large company that is decentralizing its mainframe operations and is currently using a 9370 with plans to buy many more if the system meets its needs.

Weiss said the Gartner Group expects IBM to ship 20,000 to 25,000 9370s per year beginning in 1988 or 1989. He noted that many potential 9370 users, including those with office automation needs and IBM DOS/VSE users, remain uncommitted to the 9370 pending IBM's introduction of a system code-named Silverlake, which was designed as a successor to the System/36 and 38.

"I still think there are some intra-IBM factors that make the 9370 not a done deal except in those decentralized applications I was talking about," Weiss said.

He said the applications involved tend to run under VM and that the 4300 line's traditional DOS/VSE user base has yet to be a major factor in 9370 sales.

Forrester Research, Inc., a Cambridge, Mass.-based market research group, estimated that annual 9370 shipments will hit the 23,710 mark by 1991, and the New York investment firm of Sanford C. Bernstein & Co. projected an installed base of 141,964 systems by 1991.

A surprising number of 9370s are now being shipped with IBM's Professional Office System (Profs), reported John C. McCarthy, research manager at Forrester.

"Some people are trying to force the 9370 as an office automation and personal computer integration vehicle with Profs, but I just don't think that Profs can do the job," McCarthy noted. He added that a Profs successor being written under IBM's Systems Application Architecture may address the current product's shortcomings.

McCarthy also said many 9370s will be sold as replacements for the IBM 8100 distributed processor when a migration aid is available and that the release of IBM's MVS/IS in 1990 will make it easier to distribute mainframe applications on the 9370.

In a recent survey of 26 Fortune 1,000 corporations, Forrester found that slightly more than half have no plans to order a 9370, while seven of the sites have a 9370 on order and five said they plan to order a system.

DEC may reap rewards

In another survey, West Hartford, Conn.-based research firm Focus Research Systems found that in departmental applications at large companies, the 9370's greatest impact will be on the System/38. IBM's moves in the departmental computing market, Focus said, will fuel market growth and thus benefit its chief rival, Digital Equipment Corp.

DEC last week appeared to be countering IBM's 9370 deliveries with the announcement of lower prices and increased memory capacities for several DEC VAX 8000 models that compete with the 9370 (see story page 1).

In a buying survey it conducted several months ago, Computer Intelligence in La Jolla, Calif., found that most of the systems being replaced by 9370s are small 4300s.

A spokesman said the company also noticed a handful of non-IBM processors, such as Honeywell Bull, Inc. minicomputers, are being displaced but said many of the 9370 orders are for new applications.

Chris Hallgren, an analyst with Framingham, Mass.-based market research firm International Data Corp., said it is too early to know which competitors will be hurt by the 9370, although he raised the possibility of Wang Laboratories, Inc.

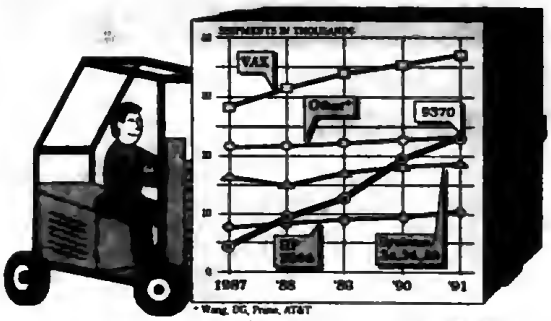
"Companies like Wang built their reputation by being small systems vendors with strong IBM compatibility, at least in terms of their communications," he said.

Hallgren said early indications are that the 9370s are being shipped primarily to companies with large data centers that have numerous branch offices such as banks, insurance companies and airlines.

Meanwhile, Dataquest's Brown noted that attempts to measure the 9370's market appeal have been hampered because IBM prohibits such firms from publicly speaking about the 9370 or even responding to a research group's buying intention survey for two years, or until IBM feels comfortable with the system's performance and waives the ban.

Mini revival

Shipment projections for leading vendors show rapid acceptance of IBM's 9370



INFORMATION PROVIDED BY FORRESTER RESEARCH, INC.
CW CHART: MITCHELL J. HAYES

Unisys president resigns

BLUE BELL, Pa. — Unisys Corp. President Paul G. Stern, the company's third-ranking executive, resigned unexpectedly last week. Unisys made the announcement in conjunction with a restructuring of top management that observers said will streamline the firm's decision making.

Stern, 48, said in a prepared statement that his departure was amicable. He did not disclose any future career plans, saying he wanted to devote more time to family and investment interests. Stern, former president of Burroughs Corp., said he will be available to Unisys for assistance and support in the coming months.

Unisys will discontinue the president's position.

The restructuring was seen as a signal that Unisys is moving out of its transitional phase from the Burroughs-Sperry Corp. merger. Chairman W. Michael Blumenthal announced the dissolution of the four-member Office of the President, which included himself and Stern, and assigned specific responsibilities to the two other members.

Former Sperry President Joseph J. Kroger, Unisys's vice-chairman, will head up Unisys's marketing strategy. James A. Unruh, executive vice-president, will oversee financial and international operations.

The changes also included the assignment of Vice-President Joseph M. Tucci to direct the U.S. information systems business. The changes take effect Oct. 1.

Hyundai hit by Intel suit

SAN JOSE, Calif. — Intel Corp. filed suit last week against South Korean firms Hyundai Electronics America, Inc. and Hyundai Electronics Co. , alleging patent infringement of erasable programmable read-only memory chips.

Intel, one of several U.S. chip makers to lobby for federal antidumping measures against Japanese competitors last year, also asked the U.S. International Trade Commission to investigate its patent infringement charges regarding the chips.

Intel also named two U.S. chip design firms and three U.S. distributors as defendants, alleging that they worked with Hyundai to develop and sell the allegedly infringing chips.

Opponents bemoan ANSI Fortran 8X additions

BY CHARLES BABCOCK
CW STAFF

Although opponents of the proposed Fortran 8X standard differ in their opinions of specific features, a cross section of those surveyed last week appears to agree that too much has been added to the language.

"We thought the ANSI X3J3 Committee was taking the language to a much greater order of change than we thought judicious," said Michael Maynard, a Unisys Corp. spokesman at company headquarters in Blue Bell, Pa.

"The stand we took was that the language was too large and incorporated too many experimental features," said Robert C. Allison, senior engineer in the compiler development group of Harris Corp., another opponent of the standard.

Heavy hitters opposed

The X3J3 Committee submitted the proposed standard, currently called Fortran 8X to reflect the uncertainty of the year of its likely approval, to its parent committee after a 26-9 vote in June. Among the nine opponents were a number of key Fortran compiler writers and users, including IBM, Digital Equipment Corp., Unisys, Harris and Boeing Computer Services.

DEC's X3J3 representative, Gary Robinson, manager of corporate standards, said Fortran is one of the languages most often used by DEC customers and that the firm wants to see a new Fortran standard emerge. Nevertheless, DEC strongly opposes the 8X proposal.

Robinson said the X3J3 Committee is attempting to add array processing to Fortran compilers at a time when the job can be done better in hardware. Two start-up manufacturers offer the feature. Putting array processing into the standard now will retard the development of this new technology, he charged.

Out with the old?

Robinson also attacked the committee's proposal to name "deprecated features" in Fortran with the understanding that they will be dropped in the next full version of the language. Robinson said such a move will make Fortran 66 and Fortran 77 programs incompatible with the new standard and that users will resist converting to the new standard.

He drew an analogy to the Cobol 85 opposition that emerged in the user community when it became known that compilers meeting the new standard would not be able to compile programs written under earlier versions. "These languages are just too old. We can't say we don't want to use their older features," Robinson said.

In addition, Robinson said the committee had a number of options to invoke that ensure 16-, 32- and 64-bit machines yield the same answer to a mathematical problem but chose none of them. DEC advocated this issue be addressed, he said.

Another feature that DEC wants to see revised is the INCLUDE statement in the Fortran 8X proposal. During a compile, an INCLUDE statement prompts the compiler to take code from an outside file. "The user is better off if the outside file is defined and certain limits put on it in the original program. The committee left it open-ended," Robinson said.

Brian L. Thompson, senior technical staff member at Concurrent Computer Corp., said he voted in favor of the proposed standard as a "good faith effort" to reach a compromise within the committee but that "we morally side with those who are against it."

Although the opponents include a number of sizable compiler writers and manufacturers, there were several compiler producers besides Concurrent who voted in favor of Fortran 8X.

IBM representative Richard Weaver could not be reached for comment.

PS/2 Model 80 storage raised

Enlarged 314M-byte drive targets shared systems; low-end model arrives

BY ALAN J. RYAN
CW STAFF

RYE BROOK, N.Y. — IBM last week announced an expanded storage capacity version of its Personal System/2 Model 80 that will target multiuser and file server environments.

The latest high-end PS/2 offering was accompanied by the announcement of the PS/2 Model 25, an Intel Corp. 8086-based entry-level system aimed at the educational, home and local-area network markets. It was also designed to work with IBM System/36 and 38 host processors (CW, Aug. 3).

Analysts said the 20-MHz Model 80-311 machine with zero to two wait states will not adversely affect sales of the other Model 80s.

They cited the computer's main selling point as its 314M-byte 5¼-in. fixed disk drive and optional second drive of the same size.

"The lower end Model 80s will be for people who need a high-performance workstation. This Model 80-311 will be more of a shared device," said John McCarthy, director of professional automation service at Forrester Research, Inc. in Cambridge, Mass.

Part of major thrust

Analyst Robert Tasker of The Yankee Group in Boston agreed. "One reason that the machine would have that size storage capacity is to act as a large server in a network," he said. "Another reason is IBM is preparing a major thrust for its computer-aided design and manufacturing processing."

Brian Jeffery, managing director of International Technology Group in Los Altos, Calif., said he believes the Model 80 could end up positioned as a mid-range system or as the low end of IBM's 9370.

"It is not a personal computer," he said. "Can you imagine a 628M-byte single user?"

"Certainly, you've got an engine that's in the power range of a System/36 or small 38 here," said William Zachmann, vice-president of research at International Data Corp. in Framingham, Mass. The Model 80-311, based on Intel's 80386 processor, will reportedly be available in the first quarter of 1988, IBM officials said.

No three-year lull

Forrester's McCarthy said IBM's release of the Model 80 has other implications.

"I think it shows how committed IBM is to driving the PS/2 line aggressively. We're not going to go through the three-year lull that we went through between the AT and the PS/2 machines," he added.

Standard features of the Model 80-311 include 314M bytes of fixed-disk storage, expandable to a maximum of 628M bytes with IBM's new 314M-byte Fixed Disk Drive Option; 2M bytes of random-access memory, expandable to 4M bytes; IBM's Video Graphics Array (VGA); IBM's Micro Channel architecture with 32-bit data path; a diskette controller; serial, parallel, pointing-device and keyboard ports; and VGA graphics capability integrated on the system board.

Other features include seven available slots and an IBM Enhanced PC Keyboard. The unit has a floor-standing design.

The Model 80-311 will sell for $13,995, and the 314M-byte fixed disk drive option will cost an additional $6,495.

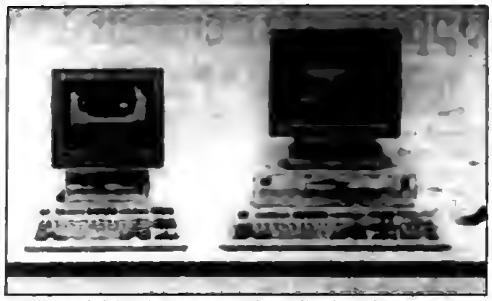
IBM's PS/2 Model 25 will sell for $1,350, but analysts said that even with educational discounts available, IBM is not likely to topple Apple Computer, Inc.'s dominance in the educational market.

Apple 'won't lose sleep'

Senior analyst Michael Goulde of The Yankee Group said IBM will have a difficult time meeting Apple's challenge in the educational market.

"While there are certain opportunities for the Model 25 because of its aggressive pricing and aggressive educational discounting, I don't think Apple has anything to lose sleep over," he said.

Further, some analysts said the Model 25 will not make a big impact in the business market. "I don't see companies — even small companies that are using System/36s and 38s — adopting 8086 technology when, clearly, the trend in the market is for 286 and 386 technology," Goulde said.



PS/2 Model 25, *left, has a much smaller footprint than the Model 30.*

Model 25's Mac assault

BY JEAN S. BOZMAN
CW STAFF

IBM finally has an Apple Computer, Inc. Macintosh look-alike. The Personal System/2 Model 25, which was announced last week, incorporates new features from IBM that play off the Mac's strengths in the areas of size, portability and ease of use.

First, there is the Model 25's screen. Its 64 shades of gray, combined with the system's Microsoft Corp. Windows software, give the PS/2 the look and feel of a Macintosh. A 256-color display is also available. Users can create a text document and, without switching screens, pick up an icon from a space just below the text to start a graphics application. All the maneuvering is done with a two-button mouse, not a keyboard command.

Perhaps spurred by the need to keep things simple for the machine's intended classroom audience, IBM has done much to speed the process of getting the machines up and running. The following are some of these features:

- A wordless instruction setup sheet. Users can follow a single-sheet flyer to set up the Model 25.
- A start-up disk, which leads the first-time user through disk formatting and file labeling. Without this feature, users had to learn Microsoft Corp.'s MS-DOS commands to perform such functions.
- A single power plug for the entire system. IBM has piggybacked the printer and system power wires so that users can plug a single power cord into a wall socket.

The entire package is also made to be portable, with a 40% smaller footprint than that of the IBM Personal Computer. A carrying case for the system is also available, making it movable like the 16-pound Macintosh, although quite a bit heavier. The Model 25 monochrome system weighs in at 28 pounds and the color version at 37 pounds.

Fortune 500

FROM PAGE 1

IBM said it has shipped 300,000 PS/2s from its production facilities to dealers and user sites as of the end of June. Storeboard, Inc.'a monthly survey of computer specialty stores showed that IBM sold 29,400 PS/2s in June, a 15% increase over May sales.

Along with IBM's sales increases, the top compatible makers — most notably Compaq Computer Corp. — have reported sales hikes as well. For June, Compaq reported a 34.5% gain over May's sales, the Storeboard study showed.

Still leery

Some users said they are hesitant to jump into the PS/2 market, not only because Microsoft Corp. and IBM's OS/2 is not available yet but because they are leery of a technology that has not had its bugs worked out.

"We're just looking right now," explained William Griggs, director of telecommunications for Champion International Corp. in Hamilton, Ohio. "We have a couple of Model 30s in evaluation, and we'll decide soon to either go with those or with PC clones."

"We're undecided. We've got to get [the PS/2s in-house] to make sure everything works the way it is supposed to," said Rick Migra, DP operations supervisor at Bendix Corp. in Elyria, Ohio. Migra said his company has ordered 10 PS/2 Model 50s, which will be connected to an IBM 3090 Model 200 mainframe in the fall.

Natural evolution

A handful of major corporate accounts, however, are not intimidated by the wait for OS/2 and have purchased or ordered significant numbers of PS/2s. MIS managers at such accounts said they see the machines as a natural evolution of previous IBM offerings.

"Buying PS/2s is just a continuation of buying ATs. We'll buy primarily Model 50s and some Model 60s," said Joseph Brophy, senior vice-president of data processing at Travelers Insurance Co. in Hartford, Conn. Brophy said the company has placed orders for 5,000 PS/2s. He currently has 200 units installed and expects to receive 400 per month in the next year.

In the last three months, Delta Air Lines and American Airlines have purchased several thousand Model 30s that the companies will use to replace their own dumb terminals and to resell to travel agencies.

Most large companies that have purchased PS/2s have centered their strategy around the Model 50 or 60. Some have bought a few Model 80s but will use those machines primarily as file servers in local-area networks (LAN).

Few major commitments

With the exception of the airlines, few companies have made a major commitment to the Model 30, either because its processor is too slow or because it is not compatible with the IBM Micro Channel architecture used in the Models 50, 60 and 80, Computerworld found.

Most said they would prefer buying an inexpensive Intel Corp. 80286 clone to a Model 30.

"If it doesn't have the [PS/2's] Micro Channel architecture, we aren't interested. The main reason for going with the PS/2s is to be able to take advantage of what will happen in the PS/2 family. The Model 30 is the runt of the litter," said Phil Gordon, an information specialist with Charles Schwab & Co. in San Francisco.

Complement, not replace

At this point, most companies are buying PS/2s to complement, not replace, existing ATs and XTs. "We are adding to our inventory by adding PS/2s, but we are not getting rid of our ATs in stock," said a Travelers spokeswoman.

As more PS/2s are installed, MIS managers are giving existing ATs and XTs to either new employees or novice users. However, some MIS managers are giving the older systems to key personnel to take home.

"A couple of years ago, when new things came out, we'd buy them and move the existing systems elsewhere," said Ed Kline, senior information specialist at Monsanto Co. in St Louis. "But what we've begun to do is put some in people's homes that work in more strategic areas."

Most of the MIS managers interviewed said they are spreading all models of the PS/2 series among a broad spectrum of users — from secretaries to MIS departments and from research and development groups to top executives. While most are presently using the models as stand-alone systems, the majority of the managers said they will gradually integrate the machines into LANs or connect them to mainframes as the communications software for OS/2 becomes available.

Correspondents Julie Pitta and James Martin and Senior Editor Douglas Barney contributed to this report.

ORACLE
YOUR HARDWARE-INDEPENDENT SOFTWARE SOLUTION

With [illegible] you'll never be [illegible] a specific hardware technology.

In this year's Software User Survey, [illegible] made Oracle the number-one choice in all three categories of [illegible] user preference.

For minicomputers, Oracle is the number-one independent software vendor for the second year in a row. *Digital News*® ranks Oracle as the [illegible] vendor in the entire [illegible] Gartner Group.‡

Oracle [illegible] the former [illegible] companies. In the [illegible] is second to no one.

And Oracle [illegible] Top-5 list of [illegible] competitive [illegible] alternatives. This is especially significant, since [illegible] done BEFORE the newest version of the ORACLE [illegible] DBMS was announced for 286/386-based PCs. Now you can write OS/2 applications without waiting for OS/2.

Mainframes, minis and micros—all running the same ORACLE. Not just compatible. Not downsized subsets. They all run THE SAME ORACLE.

The market has voted for ORACLE, the hardware-independent software solution.

We've been saying SQL compatibility, portability across micros/minis/mainframes and [illegible]'s distributed-architecture connectibility make ORACLE a [illegible] winner in your company's [illegible] strategy. Now, the users are saying it, too.

Don't settle for anything less than ORACLE hardware independence. Find out what ORACLE could mean in your own future. Call 1-800-345-DBMS today and register to attend the next ORACLE seminar in your area. Or fill out the attached coupon.

Attn: National Seminar Coordinator • Oracle Corporation • One Oracle Parkway • Belmont, CA 94002

☐ Please enroll me in the *FREE* ORACLE seminar to be held

at _____ on _____

☐ Please inform me about Oracle's 10th anniversary celebration at ORACLE WEEK from September 27 thru 30 in Washington, D.C.

☐ I can't attend your seminar, but I'd like ORACLE on my 286/386 PC [illegible]. Please send me the products checked off below, now.

☐ Professional ORACLE. $1,295. Requires IBM PC/XT, Compaq 286, or 100% compatible, DOS 3.1+, and 1.8MB of RAM. Includes the SQL*Forms™ SQL application builder, SQL*Plus™ [illegible], SQL*Report™ generator and the SQL*Calc™ 1-2-3-like spreadsheet. Precompilers included for Microsoft C and Lattice C.

☐ Precompiler for Realia COBOL. Add $300.

☐ Networking option with all available protocols. Add $395.

Prices shown include UPS shipping charges if the order is pre-paid. Since Oracle Corporation has offices everywhere, add local and state taxes to the amount below:

$ _____ Amount of purchase checked above.

+ _____ State and Local Sales Taxes.

= _____ Authorized Total (for purchase orders, shipping charges will be added to your invoice.)

Name _____ Title _____

Company _____

Address _____ City _____ State _____ Zip _____

Phone _____

Enclosed is ☐ a check, ☐ a purchase order or ☐ credit card for ☐ VISA, ☐ MC or ☐ AMEX.

Credit card or P.O. number _____ Card Exp. Date _____ Order Date _____

Authorizing Signature _____

U.S. SEMINARS

AR	Anchorage	Sep 8	GA	Orlando	Jul 15	MN	Minneapolis	Jul 28, Aug 26, Sep 29
AL	Huntsville	Jul 9, Sep 17		Tampa	Sep 10	MO	Kansas City	Jul 23, Sep 22
AR	Little Rock	Jul 7, Sep 18		Atlanta	Jul 8, Sep 16		St. Louis	Jul 14, Aug 16, Sep 18
AZ	Phoenix	Jul 14, Aug 27, Sep 24		Macon	Aug 13	NC	Charlotte	Jul 22, Sep 23
	Tucson	Aug 26	HI	Honolulu	Sep 17		Raleigh	Jul 15, Sep 16
CA	Lafayette	Jul 30, Sep 24	IA	Des Moines	Jul 15, Sep 17		Winston-Salem	Aug 12
	Los Angeles	Jul 16, Aug 13, Sep 6, Sep 30	IL	Chicago	Jul 14, Aug 19, Sep 15	NE	Omaha	Jul 8
	Newport Beach	Jul 21, Sep 17		Springfield	Aug 11	NH	Manchester	Aug 27
	Sacramento	Aug 13	IN	Indianapolis	Jul 21, Aug 12, Sep 24		Nashua	Aug 13
	San Diego	Jul 30, Sep 10	KS	Wichita	Aug 4	NJ	Cherry Hill	Jul 30, Sep 8
	San Francisco	Jul 21, Aug 16, Sep 15	KY	Louisville	Sep 10		Iselin	Jul 15, Jul 23, Aug 5, Aug 18, Sep 16, Sep 29
	San Jose	Jul 9, Aug 6, Sep 2	LA	Baton Rouge	Jul 23		Princeton	Jul 9, Aug 12, Sep 22
CO	Colorado Springs	Jul 16, Sep 17		New Orleans	Aug 21	NM	Albuquerque	Jul 7, Sep 22
	Denver	Jul 14, Aug 15, Sep 15	MA	Boston	Jul 16, Aug 25, Sep 10	NV	Las Vegas	Jul 9, Sep 8
CT	Hartford (Farmington)	Jul 23		Burlington	Sep 30	NV	Albany	Jul 14
	New Haven	Jul 28		Springfield	Sep 18		Buffalo	Aug 4, Sep 29
DE	Wilmington	Jul 9, Sep 1		Worcester	Aug 5		Long Island	Sep 15
FL	Ft. Lauderdale	Jul 18	MD	Baltimore	Jul 28, Sep 3		New York City	Jul 6, Jul 14, Jul 22, Jul 29, Aug 4, Aug 13
	Jacksonville	Sep 9		Bethesda	Jul 28, Aug 6, Sep 8			Aug 19, Sep 9, Sep 17, Sep 23
	Orlando	Jul 15	MI	Detroit	Jul 14, Aug 11, Sep 15		Rochester	Jul 30, Aug 20, Sep 22
	Tampa	Sep 10		Grand Rapids	Jul 8		Syracuse	Jul 7
GA	Atlanta	Jul 8, Sep 16		Traverse City	Jul 28	OH	Cincinnati	Aug 5
	Macon	Aug 13					Cleveland	Jul 16, Aug 13, Sep 17
HI	Honolulu	Sep 17					Columbus	Aug 4, Sep 30
IA	Des Moines	Jul 15, Sep 17					Dayton	Jul 21, Aug 16, Sep 22
IL	Chicago	Jul 14, Aug 19, Sep 15				OK	Oklahoma City	Jul 21, Sep 15
	Springfield	Aug 11					Tulsa	Aug 11
IN	Indianapolis	Jul 21, Aug 12, Sep 24				OR	Portland	Jul 21
KS	Wichita	Aug 4				PA	Harrisburg	Aug 4, Sep 15
KY	Louisville	Sep 10					King of Prussia	Jul 16, Sep 17
LA	Baton Rouge	Jul 23					Philadelphia	Jul 9, Aug 6, Sep 10
	New Orleans	Aug 21					Pittsburgh	Sep 8
MA	Boston	Jul 16, Aug 25, Sep 10				RI	Province	Jul 8
	Burlington	Sep 30				SC	Charleston	Aug 12
	Springfield	Sep 18				TN	Memphis	Jul 29
	Worcester	Aug 5					Nashville	Aug 8
MD	Baltimore	Jul 28, Sep 3				TX	Austin	Aug 12
	Bethesda	Jul 28, Aug 6, Sep 8					Dallas	Jul 14, Sep 8
MI	Detroit	Jul 14, Aug 11, Sep 15					Houston	Jul 9, Aug 6, Sep 18
	Grand Rapids	Jul 8					Lubbock	Aug 4
	Traverse City	Jul 28					San Antonio	Aug 13
						UT	Salt Lake City	Jul 28, Sep 29
						VA	Norfolk	Jul 14
							Richmond	Jul 6, Sep 8
							Virginia Beach	Jul 23
						VT	Burlington	Sep 2
						WA	Seattle	Aug 6, Sep 3
						WI	Green Bay	Aug 10
							Madison	Aug 20
							Milwaukee	Jul 22, Sep 3

CANADIAN SEMINARS

Calgary	Jul 15, Sep 8
Edmonton	Aug 25
Hamilton	Aug 18
London	Jul 14, Sep 15
Montreal	Jul 22, Aug 18
Ottawa	Jul 4, Aug 6, Sep 3
Quebec City	Jul 6, Aug 5
Toronto	Jul 7, Aug 18, Sep 8
Vancouver	Jul 23, Sep 17
Victoria	Aug 20
Winnipeg	Aug 11

ORACLE®

COMPATIBILITY • PORTABILITY • CONNECTABILITY

One Oracle Parkway • Belmont, CA 94022 • World Headquarters (415) 598-8000

Calgary (403) 233-2022 • Ottawa (613) 238-2281 • Quebec (514) 337-6735 • Toronto (416) 506-7750

ORACLEAUS (SUBSET) 441-948-8970 • ORACLE-EUROPE (HAARDEN, THE NETHERLANDS) 31-2505-63044

Call 1-800-345-DBMS today.

7004

Unisys welcomes Ally to its 4GL fold

BY ROSEMARY HAMILTON
CW STAFF

Unisys Corp. expanded its fourth-generation language offerings last week with the introduction of Ally, a system for the Unix and MS-DOS worlds.

A separate version of Ally, which was previously owned by three other vendors, is offered by Digital Equipment Corp. as a VMS product called Rally.

Ally runs on Unisys Unix-based systems as well as the company's microcomputers. But the product reportedly will be offered as an independent system and will run on any hardware platform using the Unix or Microsoft Corp. MS-DOS operating systems. Also, Unisys hopes to license the system to other vendors, according to Fred Meier, vice-president of corporate program management.

James Davey, a senior consultant at Digital Consulting, Inc., said he expects the product to do well in the Unix market, in which it will compete with Unify Corp.'s Unify and Informix Software, Inc.'s Informix. He also said Ally is "light-years ahead" of development tools in the MS-DOS arena. "This is a mainframe-class product on a micro," he added.

The initial release will support the Oracle relational data base management system from Oracle Corp. and Ashton-Tate's Dbase III, Meier said.

The Ally product had a long history before its introduction. Ally development work began in 1982 at Cary, N.C.-based Foundation Computer Systems, Inc., which is now a wholly owned subsidiary of Unisys. As an independent company, Foundation licensed the product to DEC in 1984, which introduced it a year ago as Rally.

Basil Harris, senior product manager for Rally, said the system has been enhanced since DEC acquired exclusive rights to market it on the VAX. "The products are very dissimilar in terms of what the user sees. DEC added a whole user interface layer on top of Ally that makes the application development process much easier," he said.

Rally applications can be developed to work with DEC's DBMS data base management system, RDB relational data base management system, RMS file management system and All-In-1 office automation system, Harris said.

In 1984, Encore Computer Corp. purchased Foundation and the rights to Ally. But Encore sold the company to Sperry Corp. in April 1986. With the acquisition of Sperry last year by Burroughs Corp., Foundation became a part of the new corporation, Unisys.

According to Richard Goyette, corporate program manager of fourth-generation languages at Unisys, Ally received little modification after the Sperry-Burroughs deal.

Ally is based on a concept of reusable code. It contains 140 modules that are commonly used subroutines in programming applications.

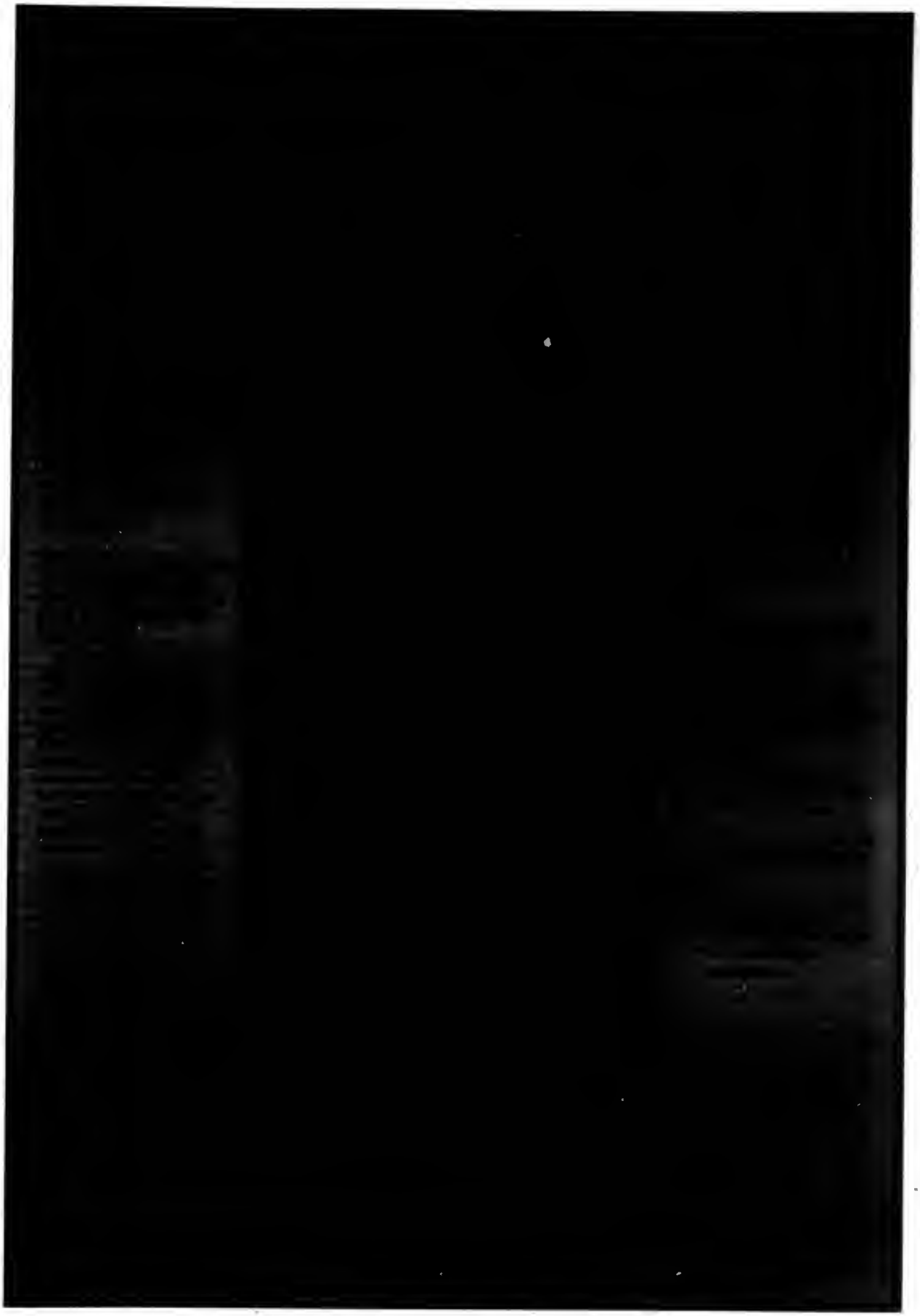
Finding its place

Ally joins two other fourth-generation language offerings from Unisys. Right now, it is unclear how the three will fit together, according to Shaku Atre, president of Atre International Consultants, Inc.

Mapper, which originated from Sperry, is a development environment that focuses on end-user computing. Linc, which came from Burroughs, is intended for the complex design of business systems.

According to Meier, Ally is a combination of Mapper and Linc. But Atre said the product is very similar to Mapper and "eventually, the company will put more emphasis on whatever one is selling better; and the other one has to find a new home."

Licenses range from $695 for an MS-DOS version to $32,000 for a large Unix system version. Runtime-only licenses, which allow users to run an application developed in Ally, range in price from $200 to $8,000.



Leading Edge to ship AT compatible

BY ALAN J. RYAN
CW STAFF

CANTON, Mass. — Leading Edge Hardware Products, Inc. announced plans last week to begin shipping its Model D2 IBM Personal Computer AT-compatible computer.

The unit, manufactured by Daewoo Telecom Co. in South Korea, utilizes Intel Corp.'s 80286 processor chip and features 640K bytes of standard memory, expandable to 1M byte on the motherboard, and a 1.2M-byte floppy disk.

John Sullivan, vice-president of Leading Edge, said he expects the Model D2 will run OS/2 when that operating system becomes available from IBM and Microsoft Corp. sometime next year.

Model D2 shipments are scheduled to begin later this month and early next month in sample quantities to Leading Edge dealers, Sullivan said. "A more representative volume will be shipped to our dealer base in the latter part of September," he said. The unit will sell for $1,495.

Also scheduled to be shipped are an optional 30M-byte hard-disk version, which will sell for $1,995, and a "superspeed" drive, which will reportedly be a sub-30-msec drive with either a 30M-byte or 40M-byte hard drive, according to Sullivan. No price has been set.

Fighting bad rap

While Leading Edge has been often criticized by dealers and customers because of delays in shipping its Model D computer, Sullivan said the firm is combatting that reputation.

"We have been getting products out on a more timely basis during the last couple of months," he said.

The company said the 286 clone is one-third smaller than the comparable PC AT, with a footprint of 16 by 15½ in. and is about 6 in. high.

NCR pays user record damages

BY CLINTON WILDER
CW STAFF

SAN LUIS OBISPO, Calif. — NCR Corp. recently reached a multimillion dollar out-of-court agreement that represents the largest damages award ever granted in a user suit against a computer vendor.

The settlement, made earlier this year, ended eight years of legal battling between Madonna Construction Co. President Alex Madonna and the Dayton, Ohio-based systems vendor. Norman Cohen, an Atlanta-based consultant to users who have sued NCR, said Madonna received almost $6 million.

An NCR spokesman denied that figure and declined further comment except to say the settlement was "amicable."

Surpasses previous record

Madonna had won a record $5.8 million damages award in a California Superior Court decision two years ago [CW, June 3, 1985], far surpassing the previous record $2.6 million awarded to an Oakland, Calif., dry cleaning firm, Glovatorium, Inc., in 1982.

NCR agreed to the settlement one day before its appeal of the 1985 Superior Court decision was to be heard in a Santa Barbara, Calif., appeals court, a source close to the case said.

Neither Madonna nor his attorney nor NCR would confirm the amount of the settlement.

Madonna, the leader of one of California's largest highway construction contractors, said he was "very pleased" with the settlement but declined further comment. NCR generally requires the plaintiffs in user suits to sign nondisclosure agreements after their cases are settled.

PS/2 board, floppy drive hit market

Tecmar founder's start-up leads charge as third parties solve Micro Channel puzzle

BY ED SCANNELL
CW STAFF

CLEVELAND — Cumulus Corp., a start-up company headed by Tecmar, Inc. founder Martin Alpert, last week introduced a multifunction add-in board for the IBM Micro Channel-based Personal System/2 family along with an external 5¼-in. floppy disk drive that can act as the A drive on the PS/2.

The multifunction board, called Curam, holds up to 8M bytes of memory and has an optional 2,400 bit/sec. modem and an I/O card containing a serial or a parallel port in one slot. A 2M-byte version of the board costs $995, with 2M- and 4M-byte daughter cards priced at $595 and $995, respectively. The modem will sell for $445.

By combining multiple functions on a single board, Curam gives users who are considering a PS/2 Model 60 for its expandability a strong reason to purchase the less expensive Model 50, which has only three expansion slots, according to Cumulus President Alpert.

By using two Curam boards, users "can get 16M bytes, serial and parallel ports and a modem for the Model 50," he said. "For a lot of people, that's the difference between buying the Model 50 and Model 60."

Doing the impossible?

IBM claims the Model 50 cannot be upgraded past 7M bytes, but Alpert said Cumulus has run the system with 16M bytes, leaving one slot still open.

The multifunction board supports both the Lotus/Intel/Microsoft Expanded Memory Specification (EMS) and the Enhanced EMS. The latter can be used to run multiple IBM PC-DOS programs in more than 640K bytes of memory space; EMS is commonly used to store large blocks of data in memory.

The external drive, called Stepping Stone, includes software and microcoded hardware, which allows it to function as the A drive. That feature is important for users of Lotus Development Corp.'s 1-2-3, which is copy protected and requires a key diskette in the A drive in order to run. Stepping Stone can also be used to convert programs from 5¼- to 3½-in. formats. The price, including a half-height drive, a controller, cabling and software, is $345, compared with $395 for IBM's external 5¼-in. drive.

Cumulus said it is currently shipping Curam and that it intends to ship Stepping Stone in the next two weeks.

Alpert, who developed some of the first add-in products for the original IBM PC at Tecmar before selling the firm to Reson, Inc., said writing to the Micro Channel architecture was a delicate job. "You have to be very conscious of timing, particularly in the area of direct memory access," he added.

Despite reports earlier this year from add-in board makers that it would be extremely difficult to develop a multifunction board for the Micro Channel, Alpert said his firm had little difficulty because it "piggybacked" the daughtercards on the board, essentially creating a multifunction card from three separate boards.

Cumulus will introduce a complete line of products for the PS/2 and is now working on six products for "specific markets that are large and growing," Alpert said, including communication products that take advantage of the Micro Channel's ability to support multiple processors.

"We have a distinct strategy now, based on multiprocessors and [Microsoft and IBM's] OS/2. Our goal is to have a product ready by the time OS/2 ships," Alpert said.

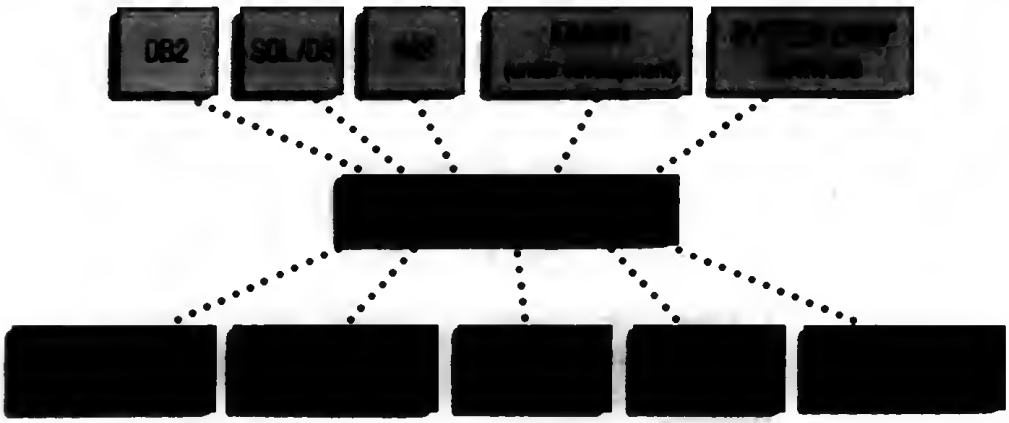
Chart rewrite to offer 3-D

REDMOND, Wash. — Microsoft Corp. is scheduled to announce today a new version of Chart, a $395 graphics package for IBM Personal Computers and compatibles, that is aimed at business and scientific applications.

Microsoft Chart Version 3.0 now includes mouse support and support for three-dimensional graphics, features lacking in the firm's earlier versions. The package will be available immediately.

Unlike earlier versions, the package runs on local-area networks (LAN), including Microsoft Networks and any network compatible with IBM's PC Network. LAN support is built into the product to let users share expensive peripherals, such as laser printers and plotters, and provide users with external data. Each additional user on a network must purchase the $195 Workstation Pack. For the scientific community, the package includes expanded statistical functions such as regressions and line smoothing.

Get the Facts from Your DBMS.



The most powerful applications software has joined forces with the most popular data base management systems. To turn raw data into meaningful facts. To analyze, estimate, optimize, simulate. To produce custom reports and color graphs. Whatever your information need, the SAS System delivers more from the data you store.

Don't Just Store Your Data. Explore Your Data.

The SAS System's ready-to-use tools uncover the real meaning of all those names and numbers. Forecast sales and cash flow. Perform statistical analyses. Build financial and planning models. Create spreadsheets of unlimited size. Schedule projects for best use of time and resources. Produce stacks of personalized letters. Generate calendars, charts, and many other formatted reports. Spot relationships and graph trends with powerful presentation graphics.

Or develop your own applications with the SAS System's efficient fourth-generation language. Customize these applications any way you wish.

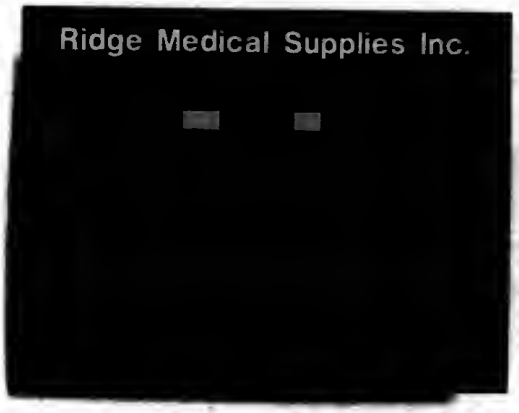
who know nothing about data bases, have immediate access to the data they need. It's as easy as filling in the blanks!

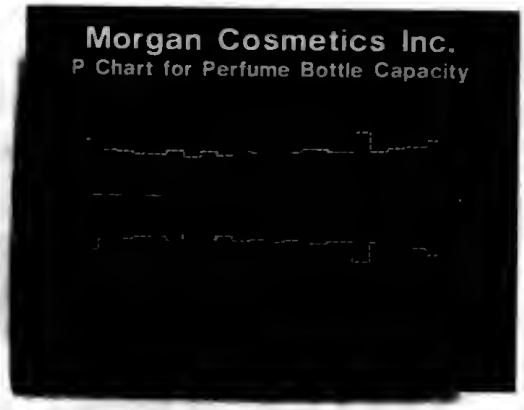
Extract data from your DBMS for use in SAS System applications. Load data from the SAS System directly into your DBMS. Update values in a data base directly from a SAS System application. All without risk to data security. The SAS System lets you choose which users browse or update specific files.

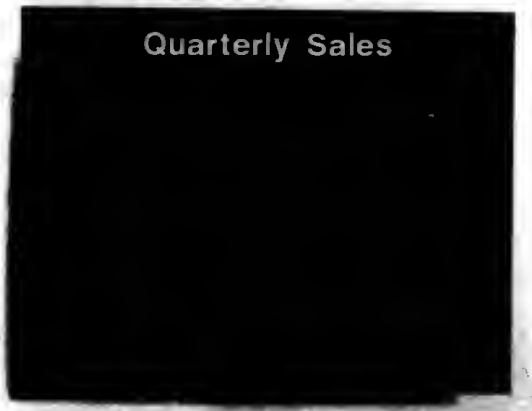
Get the Facts Today. And Get 30 Days FREE.

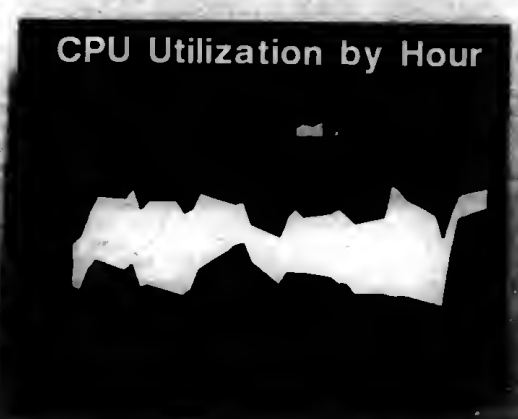
Bring the SAS System together with your data base. You'll realize [illegible]

Get the SAS® System.









DEC starts Mac attack with VAX data link

BY DOUGLAS BARNEY
CW STAFF

MAYNARD, Mass. — In a move aimed at boosting sales of its VAX computers to Apple Computer, Inc. Macintosh sites, Digital Equipment Corp. will cooperate with Odesta Corp., maker of Helix, on development of a data base that runs on both Macintoshes and VAXs.

The agreement, set for announcement tomorrow, is the first public endorsement by DEC of any Macintosh-oriented product. "It is very unusual for DEC to go that far. They get involved in very few joint announcements," said John Rutledge, vice-president of research for Dillon, Read & Co., a New York-based investment firm.

Under the agreement, DEC will supply Odesta with software and hardware for development, use Helix as a tool for DEC sales agents and give Odesta direction on product implementation. A key goal for DEC and Odesta, one source said, is to allow DEC terminals to access Helix VMX.

For DEC, the announcement is part of an overall strategy to embrace a variety of desktop architectures. "We are interested in attracting all people with devices on their desks, whether they happen to be Digital devices or other peoples' machines," said Richard Smith, DEC's manager of business development for the Microvax. DEC has already made such an effort to attach IBM Personal Computers and compatibles to VAXs and Microvaxes.

Now DEC is going after Macintosh users. "I am interested in the people who own Macintoshes and maybe don't know about Digital. They might be a lot more interested in us now that they know they can start out with Helix on the Mac and move up to the VAX with absolutely no change in the style of computing," Smith said.

Despite this agreement, DEC has still not stated its position on the Macintosh itself, which competes against DEC's Vaxmate, an IBM PC compatible.

"Don't read anything about Macs into this," Smith cautioned. Rather, it is an example of DEC's "open network policy," he argued.

Apple sees endorsement

An Apple official, however, said he believes the announcement proves that DEC is behind the Macintosh. "The DEC relationship endorses the whole concept of programming with the unique tools and approaches available in the Mac environment as much as it also endorses the Macintosh as a workstation," said Peter Hirshberg, marketing manager for desktop communications at Apple.

DEC's effort should be largely aimed at helping Odesta enhance Helix VMX, which requires a VAX or a Microvax. Unlike earlier versions of Helix, which run only on the Macintosh, Helix VMX provides applications development on a Macintosh, with much of the processing distributed on the VAX. Helix applications are developed with an icon-driven system rather than more conventional programming languages with which it can be difficult and time-consuming to work.

According to Odesta founder and President Daniel Cheifetz, the DEC backing provides a product development boost. "What they are doing is more than just a blessing. They are providing hardware and software support and a significant level of technical support," Cheifetz said.

Odesta is reportedly working to enhance Helix's access to VAX Record Management System (RMS) files. "Eighty percent of the data in VAXs is in RMS flat files. You won't have to use the Helix file structure in the future," a source said.

Continued on page 94

FCC approves major AT&T rule change

Tentative plan would install price ceiling on long-distance services, remove profit cap

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Led by Chairman Dennis R. Patrick, the Federal Communications Commission last week voted 4-0 for a tentative proposal that would dramatically change the way the agency regulates AT&T's long-distance services and could possibly boost the carrier's profits.

The so-called "price caps" proposal, still subject to many months of public comment and FCC deliberation before becoming a final regulation, would set price ceilings on all AT&T long-distance services and remove ceilings on AT&T's profits.

The new scheme would replace the traditional form of utility regulation, which limits the company's rate of return and sets fixed prices [CW, July 27].

Under Patrick's proposal, AT&T's earnings could increase with virtually no limit, in order to reward the carrier for cutting costs. AT&T could raise or lower rates for long-haul services at will, as long as it does not exceed the price cap, which would be adjusted annually.

Users question price caps

For AT&T's largest customers, the key issues will be the determination of which services get price caps, the reasonableness of the initial price caps and the soundness of the factors used to make annual adjustments, according to James S. Blaszak, counsel for the Ad Hoc Telecommunications Users Committee.

In previous statements, users groups have expressed concern that the first set of price caps will be set too high.

"What the proposal clearly gives AT&T is greater flexibility to retain revenue and make more money," Blaszak said. "It's not clear that they will — it depends on the extent to which they can make their operations more efficient."

Under rate-of-return regulation, cost-cutting efforts that push earnings above the profit ceiling must be refunded to ratepayers. With Patrick's proposal, AT&T could keep some of the earnings derived from greater efficiency.

Wall Street responded favorably to the action. AT&T's stock rose to $32 a share, up 25 cents, in very active trading on the day of the FCC's vote.

The commission said that rate-of-return regulation should be replaced because it has numerous flaws, including perverse incentives to inflate and shift costs from unregulated business ventures to regulated services, since the costs are recouped from ratepayers.

Pricing benefits cited

"By contrast," Patrick explained, "price caps would appear to reduce the incentive to cross-subsidize, might reduce the ability and incentive to engage in any predatory pricing of competitive services and might increase carrier incentives to cut costs, innovate and realize efficiencies."

In addition, Patrick said price caps would protect ratepayers from sharp rate hikes.

The FCC proposal applies to so-called dominant carriers in the interstate services market, so it could be applied to the divested Bell operating companies as well as to AT&T.

However, the FCC said the new regulatory regime will first be implemented for AT&T and perhaps later for the Bell companies.

Bankamerica cozies up to AI to assist lending procedure

BY CLINTON WILDER
CW STAFF

SUNNYVALE, Calif. — As part of its effort to improve its loan portfolio and recover from massive losses, Bankamerica Corp. has turned to an unlikely source: artificial intelligence.

The U.S.'s second-largest bank recently invited 93 of its top executives from the U.S. and overseas to a series of four-day training programs on the commercial lending process. The Executive Lending Forum took place at the small Sunnyvale headquarters of start-up AI software developer Syntelligence, Inc., whose Lending Advisor expert system was the cornerstone of the training programs.

Lewis Coleman, executive vice-president of credit for Bankamerica's world banking division, said he chose an expert system because of its ability to incorporate the multiplicity of factors involved in approving or rejecting a potential debtor. Syntelligence employees programmed six actual Bankamerica loan situations into the Lending Advisor, and bank executives ran the expert system on IBM 3270 Personal Computers linked to Syntelligence's IBM 4381 mainframe.

"An AI system allows you to be able to run lots of variables in a much more efficient way and get a much better feel of the sensitivity of various credit situations," Coleman said.

Cooperative development effort

Introduced in late 1986, the Lending Advisor analyzes an array of loan-decision variables to assist loan and credit advisers with credit evaluation. Syntelligence developed the product in conjunction with loan officers at Wells Fargo Bank NA in San Francisco and Winston-Salem, N.C.-based First Wachovia Corp. Both banks recently installed a new release of the product.

Coleman was familiar with the product, as a former executive with Wells Fargo during the development effort with Syntelligence. To run the Bankamerica Executive Lending Forum, Coleman called on Tom Hofstedt, a Redwood City, Calif.-based bank credit consultant and former professor at Stanford University Business School.

"I had thought that expert systems were blue-sky technology, a long way off," Hofstedt said. "But the system forced the bankers to ask the right questions. The bank views its problems, to some extent, as related to bad decisions. Part of the solution to that lies in better analysis, and some of it lies in technology."

Forum participants attended daytime seminars at the Sunnyvale Sheraton, then ran the software on Syntelligence computers after regular business hours. Syntelligence did not charge a fee for the seminars but hopes to license the Lending Advisor to Bankamerica in the future, according to Syntelligence President Sheldon Breiner.

'Rapid-fire language course'

"Very few of these people were computer literate except for some PC spreadsheet experience," Breiner said. "They did not come here to play golf. The goal was for them to look at the Bankamerica loans in ways that they hadn't before. It was like getting a rapid-fire language course."

Bankamerica's Coleman said he hopes the Executive Lending Forum experience will help overcome some suspicions about AI technology within the bank.

"In the loan business, you're making a decision about future cash flows, and there is no absolute right answer," he said. "An awful lot of people have made their careers on the value of their own judgment, and they're reluctant to deal with a system that might subtract from that value. But that comes from people who don't understand how the system works. Good analysis provides the framework for good judgment."

Although many leading banks are developing or using expert systems internally, Syntelligence's Lending Advisor is one of only a handful of commercially available products, said AI consultant Harvey Newquist of DM Data in Scottsdale, Ariz. But, he said, commercial lending may be ripe for such a product.

"The industry shouldn't take this the wrong way, but the idea of a hamburger university like McDonald's is beginning to be true of the banking industry," Newquist said.

"You'd like to establish a base level of performance, so something like an expert system can help do that," he added.

In a separate announcement, Syntelligence introduced a release of its expert system for the property/casualty insurance industry. Release 2.0 of the Underwriting Advisor is said to contain improved communications interfaces to accept electronic transfers of data from a user's other mainframe software applications.

PC additions keep Tandy in competitive field

BY ALAN ALPER
CW STAFF

NEW YORK — Seeking to solidify its position as a leading alternative to IBM in the microcomputer industry, Tandy Corp. last week unveiled four IBM Personal Computer-compatible systems spanning the performance spectrum.

At a press conference here, the Fort Worth, Texas, firm brought out its first Intel Corp. 80386-based microcomputer, its initial PC-compatible laptop and an Intel 80286-based version of its Model 1000.

These micros continue Tandy's strategy of remaining compatible with existing Microsoft Corp. MS-DOS standards while providing a vechicle — via the 286- and 386-based PCs — to eventually run applications that take advantage of the multitasking capabilities of OS/2, the next-generation operating system jointly developed by IBM and Microsoft. Tandy said it will continue to study the Micro Channel architecture used in IBM's Personal System/2 line and will only provide compatible products if market requirements are identified.

Tandy said it will also continue to aim its efforts primarily at small to medium-size businesses and home users, although the company remains committed to its recently created outbound sales force, whose charter is to increase penetration of larger corporations.

Citing industry research, John Roach, Tandy's chairman and president, said approximately 3% to 4% of the country's largest corporations are Tandy customers. That figure, he conceded, was not up to initial expectations.

Analysts said last week that the Tandy PCs round out the firm's product line, offering better performance at aggressive price points. The products could enhance the company's attractiveness to large corporate accounts, but Tandy needs to learn how to sell and service major corporations and reduce overlap between its national and local sales forces before it can hope to bolster its position, analysts said.

The firm's 386-based micro, with a base price of $2,599, will be intriguing to some large companies with budgetary restrictions, but aggressive pricing is not always sufficient to attract large corporate users, noted Tom Roberts, an analyst with International Data Corp. in Framingham, Mass. "It's still a Tandy or Radio Shack machine, which has little status in large corporations," he said.

Tandy's top-of-the-line Model 4000 comes standard with one 3½-in. 1.44M-byte floppy disk drive and a 386 microprocessor running at 16 MHz. The Model 4000's bus structure is compatible with IBM's PC XT and AT and offers two 8-bit expansion slots and six 16-bit slots. It will operate as a stand-alone processor or a file server on a PC network and support MS-DOS 3.3, OS/2 and AT&T's Unix System V, Release 3.

With a 20M-byte drive, the Model 4000 is priced at $3,499. Adding a 40M-byte drive boosts the price to $4,299. In contrast, IBM's Model 80-041 lists for $6,995, and Compaq Computer Corp.'s Model 40 costs $6,499.

Laptop debut boasts clarity

Tandy's first PC-compatible laptop — the 1400 LT — features a backlit, supertwist LCD, which is said to provide greater viewing clarity. Priced at $1,599, the Intel 8088-based portable features 768K bytes of random-access memory, dual 720K-byte 3½-in. floppy disk drives, a 76-key keyboard with 12 function keys and a serial and a parallel interface. The unit includes a 12V battery pack with a life of four hours and an AC adapter. An optional spare battery pack is available for $79.95, the company said.

The high-end 286-based Model 1000 — the 1000 TX — is priced at $1,119. The 1000 TX offers 640K bytes of internal storage, expandable to 768K bytes; a single 720K-byte 3½-in. floppy disk drive; five expansion slots; and MS-DOS 3.2. The machine comes bundled with Personal Deskmate 2, Tandy's second-generation graphics-oriented user interface that uses Microsoft Windows conventions and features integrated applications.

Other announcements by Tandy included the following:

- Two versions of its Model 3000. Tandy increased the clock speed of its original Model 3000 to 12 MHz and reduced the price by $200 from $1,999. The 8-MHz Model 3000 HL was reduced in price by $200 to $1,499, making it Tandy's lowest cost "OS/2-ready" computer, the firm noted.
- A version of the Deskmate integrated software package for computing professionals using any of Tandy's PC-compatible systems. Professional Deskmate is priced at $149.95. Through Desklink facilities, users can share applications such as electronic mail or phone listings. Users can exchange data via RS-232 interconnection, a 3Com Corp. network or Tandy's Tandylink twisted-pair network.
- The $699 Model 1000 HX, which features MS-DOS 2.11 loaded into read-only memory and includes a single 720K-byte 3½-in. floppy disk drive.

All the Tandy products are currently available except the Model 3000s, which will be available in the fourth quarter, the company said.

What can you expect from the new LaserJet Series II Printer?

we never stop asking "What if..."

Everything.

Because the LaserJet Series II Printer from Hewlett-Packard is the product of experience. It's a second generation printer from the company with the world's largest installed base of laser printers.

Whatever your company's needs, the LaserJet Series II will deliver the performance you expect, at up to 8 pages/minute.

Take a simple memo like the Soup letter we created with Microsoft Word. As you can see, you can print in a variety of formats and type styles with our wide selection of LaserJet fonts.

Or you can create a sophisticated combination of text and graphics. With additional plug-in memory, you can also produce full-page 300 dpi graphics, like our Nuts form shown below. To do this, we used HP's new ScanJet desktop scanner, Microsoft Windows and Pagemaker® from Aldus.

With support by more than 500 of the most popular software packages, the LaserJet Series II Printer can produce whatever type of business document you need. And LaserJet Series II works with all popular PCs so it can easily be integrated into your existing system.

In fact, only the price is unexpected —starting as low as $2,595.*

For the authorized dealer nearest you, call us at 1 800 367-4772, Ext. 900A.

HEWLETT PACKARD

Business Computing Systems

Microsoft is a registered trademark of Microsoft Corp. Pagemaker is a U.S. registered trademark of Aldus Corporation.

*Suggested U.S. list price. © 1987 Hewlett-Packard Co. PE12701

Digital has it now.

When The Johns Hopkins University decided to launch an ambitious fund-raising campaign, its Development and Alumni Services Department decided to do something even bolder—break away from the administration's traditional [illegible] environment. And go with a system from Digital.

"We needed control of our own priorities," says Mel Vogelsang, Director of Development and Alumni [illegible]. "Our old system was too difficult to access. It could never have handled the new [illegible]."

[illegible] easy. Now they can quickly move up to more powerful, [illegible] and operating system. What's more, their new system can [illegible] third-party's to Hopkins' own. [illegible] their software. Not to mention lots of upgrades. "This [illegible] more applications, faster

[illegible] that raised [illegible] eyebrows when it [illegible] Johns Hopkins raise [illegible] few million dollars."

[illegible] remarks. "I'm constantly faced with growth. And Digital's open architecture lets me add on whatever I need."

How successful is the department? According to Vogelsang, "We've cut response time from three weeks to three days. And when needed, to three hours. In fact, we've tripled the work processed. Now, we have time to branch out into event management, alumni networking. Even a little PR.

"I feel like we've become real contenders in the very competitive world of fund-raising."

To find out how we can give you a competitive edge, write: Digital Equipment Corporation, 200 Baker Avenue, West Concord, MA 01742. Or call your local sales office.

digital™

EDITORIAL

Who's the boss?

Steve Stanton calls them the "Johns and Marys."

We all know them. They're the people in the various discrete departments in organizations — marketing, sales, engineering, etc. — who started out as informal advisers to personal computer users years ago and eventually evolved into the micro gurus of today. They are the driving force behind micro purchase and implementation strategies, Stanton holds.

Down the hall from Stanton at the Index Group, Inc., a widely respected Cambridge, Mass.-based MIS consultancy, is Tom Davenport, research director and former end-user computing manager at Harvard University.

Davenport sees the situation differently, with MIS calling the shots and — rightfully so, he says — driving corporate micro strategies.

Each consultant can point to numerous examples in the real world to support his viewpoint. And each is correct, because the real world today is a mishmash of differing micro implementation strategies. And this begs the vital question, Which strategy is the best? Should MIS assert itself in the micro area to the extent it has with larger systems? Or is it a better idea to leave the development of micro strategies to John and Mary?

One thing is clear: MIS is increasingly cited as the department with primary responsibility for implementing micro strategies and specifying PC purchase plans. A survey earlier this year of several hundred *Computerworld* readers showed MIS holding this primary responsibility in seven out of 10 cases. This data is fully supported in a soon-to-be-released independent survey of 1,000 medium-size and large sites.

So while a trend is apparent, the question still remains as to whether the trend is a desirable one. Our feeling is that it is not only desirable but also essential to the long-term viability of information systems strategies.

Furthermore, it seems that this desirability is being recognized by the Johns and Marys, as former micro managers are steadily moving into mainstream MIS operations in many organizations. Such managers say they gain more respect in doing so, and they certainly position themselves closer to the seats of corporate power, since information systems are rapidly being absorbed into the organization infrastructure.

A similar potentially contentious situation is brewing between MIS and communications professionals. As greater proportions of information outlays fund expanded data and telecommunications operations, telecommunications managers are seeking greater influence and independence from their MIS bosses.

What MIS needs to do is strike a fine balance between the need to grant greater autonomy to subdepartments and the need to hold the information structure together with a skillfully crafted, integrated strategy. This will increasingly require the compromising skills of Henry Clay, the managerial acumen of Lee Iacocca and the visionary abilities of Jeanne Dixon. Any takers?

LETTERS TO THE EDITOR

Employee hunting

This is an open letter to those who need programmers.

You will never find the person you are looking for if you rely on your personnel department to screen applications. I know because, after two months and 50 applications, I have yet to talk to a real computer person.

Obviously, I have been going about my job search in the wrong way. Actually, it has been several wrong ways. But what do you really want — an expert on job hunting or an expert programmer?

I have some suggestions to protect your own interests. First, do not just give your personnel department a list of languages and operating systems unless you are really looking for a new resident guru.

Applications programming requires knowledge of an editor, a language and your locally defined methods of compiling, linking and running the program. Everything else about your programmer/analyst's job depends on your applications, your business and your local practices. Fitting into them is the hard thing to learn and should top even the programming language in evaluating experienced candidates.

Second, give your personnel department a short form letter to accompany the standard reply. Many resumes will be rejected because personnel employees cannot make sense of them or see how their contents apply to the available job. That may mean the applicant cannot write a resume or that his experience is unfamiliar to those in personnel. Neither should be a surprise, and neither should disqualify him from your search.

Why not give him your selection criteria and a structure within which to discuss himself? Then you can be confident that you will really learn how well he fits the job.

Finally, what you should be looking for is a package of processing power and understanding that will let you implement the ideal employee. You will have to program him to some extent.

Keep in mind that the easiest reason for the personnel department to reject him will be the programmer's ignorance of the things that are the easiest for him to learn. Your risk is not that you will not get good candidates, but that you will miss the best.

Donald H. Sweezy
Raleigh, N.C.

This week in history

Aug. 8, 1977
If programmer productivity remains at its current snail's pace of 3% a year, automated information processing will become the most labor-intensive industry outside of agriculture by 1985, warns Richard I. Tanaka, president of the International Federation for Information Processing.

Aug. 9, 1982
The Stevens Institute of Technology in Hoboken, N.J., has announced that freshmen entering the school's computer science, systems planning or management programs will be required to own an Atari 800 personal computer system.

Relational notes

John Blumberg makes some inconsistent remarks in his article concerning the relational model, the Pick system and miscellaneous data base management systems [CW, July 6].

Two such remarks are the following:

- "The Pick system . . . became commercially available in 1974."
- "Pick's relational data base predates the published works of Edward Codd . . ."

Blumberg clearly made an incorrect guess as to my first name, which is Edgar. My first technical papers on the relational model were the following:

- "Derivability, redundancy and consistency of relations stored in large data banks," IBM Research Report RJ599, Aug. 19, 1969. This report was unclassified and therefore readily available to the public.
- "A relational model of data for large shared data banks," the Communications of the ACM, Vol. 13, No. 6, June 1970.

Of course, I have published numerous others. I would like to challenge Blumberg to answer publicly the following questions:

- What were the papers you or your colleagues published prior to August 1969 that defined the relational model or the approach based on it?
- Where were you and your colleagues during the data base management wars of the 1970s? I did not see you in the trenches.

I have yet to see any sign of any Pick developers putting their reputations on the line by publishing technical papers concerning the relational model.

E. F. Codd
The Relational Institute
San Jose, Calif.

Cold shoulder to network integration

Expense, uncertainty and absence of common system environments leave field untapped

FREDERIC WITHINGTON

For a decade, vendors have been telling users to integrate their communications networks — to combine data with voice and, where relevant, image transmission, or at least combine all data networks into one.

A flood of products has been introduced to support network integration — protocol converters, voice/data private branch exchanges (PBX), satellite earth stations, integrated workstations, video/audio teleconference equipment and the like. And for a decade, users have greeted these network integration products with a yawn, to the general detriment of the industry's growth rate.

The following are three examples of organizations that considered integrating networks — and decided not to.

One of the country's largest insurance companies is composed of divisions that share some resources, including communications facilities and a computer center. However, each division created its own applications, which led to the use of differing terminals and protocols and therefore to multiple communications networks. The manager of central facilities wants the divisions to convert to common protocols so a single, integrated network can be used. The divisions, comparing the cost and inconvenience of changing software with the benefits, have so far refused.

A government agency considered installing a voice/data PBX to handle the traffic of its voice, word processing and data terminal networks. The vendors of processors and terminals could not support multimedia service, however, and end users voted to put up with the inconvenience of multiple terminals rather than learn new systems. So larger versions of the separate systems were installed instead of an integrated one.

Two manufacturers of medical supplies merged. Each had an order entry network for salesmen and customers to use. They considered integrating the networks but found the major saving could be made just by installing multiplexers that enabled the networks to share leased communications lines. To go further would have meant changing software, behavior patterns and large numbers of terminals for little further gain.

Some of the following novel services were supposed to lead to integration of networks but have not done so:

- Shared data services were going to induce both business people and consumers to use telephone lines for data inquiries and electronic mail, as well as for voice. After at least 10 years, most providers, except those owning really valuable data, are languishing, and the use of dial-up modems is pretty well restricted to professional personal computer users.
- Teleconferencing was going to create big new markets for multimedia teleconference room equipment and satellite earth stations. Instead, what teleconferencing there is either uses entertainment TV facilities or is restricted to voice and low-rate freeze-frame images.
- Electronic Data Interchange was (and still is, enthusiasts say) going to cause companies in many industries to integrate their data networks. This integration has happened only in industries that already shared data definitions and high levels of transaction interchange. Others are tangled up in standards squabbles and cost-justification studies that persistently come out negatively.
- Desktop publishing is the latest development supposed to lead to the integration of office and data networks. However, most installations are turning out to include only a few workstations, a shared file and a local laser printer.

TOM LULEVITCH

Keeping progress at a minimum

What's held up progress? Four factors, apparently. First, the absence of common system environments in the networks to be integrated. This one the vendors acknowledge: Diverse communications protocols, system programs and data elements make integration difficult.

This lack is slowly being remedied. Vendors are making progress in developing hybrid systems; de facto (and de jure) standards are emerging at a reasonable rate, and users are slowly squeezing out off-standard networks. More network integration will doubtless result, but not as much as the vendors hope because of the remaining three factors.

Second, the absence of common interest among users. Buyers and sellers of products must communicate information related to orders, and some forecasters say many of them will soon be doing this network to network. But in today's world, such communications are usually reviewed by a person who takes some action, enters the result into a data processing system and simply files the original communication. There is rarely a common interest in interconnected data networks. Even within an organization, departments talk mostly to themselves. When marketing, manufacturing and finance departments talk to one another, it is in terms of finished transactions in relatively low volume or orally. When they talk to top management, it is in terms of financial summaries or, again, orally.

It may be worthwhile to interconnect departmental networks to speed up low-volume communications, but there is rarely enough common traffic or common site coverage to justify full integration.

Third, an inadequate financial benefit. The main cost offset by integrating networks is communication line cost. But a combination of multiplexers and competition has brought communication line costs down. And the cost of integration, which usually requires rewriting software and converting files to a standard, is often high. Many user organizations guiltily add up the costs of their redundant networks, compare this to the cost of network integration and are surprised to find that integration does not pay.

Fourth, resistance to behavior change. This intangible factor is often enough to offset any cost reduction that survived the justification study. People's communication facilities become part of the way they do business. They turn to the telephone, the data terminal or the workstation for rapid service, expecting to use the operating procedures that have become instinctive with practice.

If new operating procedures must be learned, there is naturally resistance and lowered productivity until they become instinctive. Integrated, multimedia networks necessarily involve learning new operating procedures, so user resistance to them is to be expected.

The bottom line is simple. Don't integrate any networks until you're satisfied you have common system environments, the costs are justified, the network users have enough interest to make this project worthwhile and users will accept the behavior change. If you're satisfied, go ahead, and more power to you. If you're not, you're in good company — that of most systems managers in the country.

A 30-year veteran of the computer industry, Withington was a vice-president of Arthur D. Little, Inc. and is now an independent consultant. He has written four books and more than 60 articles and papers.

Grafting a hybrid distributed data base

READER'S PLATFORM

DENNIS CRANE

C. J. Date's article, "Twelve rules for a distributed data base" [CW, June 8], presents an elaborate analysis of requirements for an ultimately flexible implementation of a distributed system. It challenges designers and implementors to press for a degree of integration, transparency and independence (hardware, networking and operating system) that is beyond practicality in today's world.

I would have appreciated an equally thorough review of the circumstances and business justifications for such a robust implementation of a distributed data base. What real-world situations actually call for such an architecture? How would the system compare on a benefit/cost basis when due consideration is given to orchestrating the degree of independence called for in the article?

The truly distributed data base, as proposed by Date, may be analogous to a town deciding that the best way to complement an old library would be to catalog and inventory all the books that each of the town's residents maintain at home and then design a scheme by which any resident could conveniently access, if and when interested, all of this reading material.

Obviously, the town would save the cost of building a new central library, and people would not have to learn the Dewey decimal system or travel downtown to get a book.

How practical is it?

Perhaps it would be easier to borrow the book from a neighbor. But what if the neighbor is away for the week? And how practical is it to ask that everyone organize and catalog the books in their home libraries in the same manner, on the off chance that a fellow townsman might wish to locate and borrow one? And who will be responsible for ongoing compliance with the cataloging scheme, assuming it can be agreed to in the first place?

Practically speaking, most business applications calling for distributed data bases are likely to be served by a hybrid architecture with the following characteristics:

- Data created and used most frequently by a certain user will be retained locally.
- Data created by one person and frequently accessed by many others can be stored centrally.
- Convenient provisions exist for users with disparate hardware and software to access the centrally stored information.
- Procedures are established to request updates to centrally stored information and request data that might be retained locally. Procedures could include indexing or periodic update schedules.

Implementing such a system requires recognition and acceptance of the diversity of the hardware, software and networking likely to prevail in the business environment, particularly when originators and users of the data belong to different business entities.

I applaud Date's well-presented guidelines and encourage designers to consider some of these concepts, along with the concept of a hybrid data base, when constructing actual systems to address most real-world requirements.

Crane is the manager for the Mountain States region of GE Information Services, a division of General Electric Co., in Englewood, Colo.

Be one of the first to get started on MS OS/2.

Soon there will be only two kinds of software developers.

Those up to speed on Microsoft® Operating System/2. And those trying to catch up.

To help you to be one of the first kind, we've put together a special beta-release software development kit.

Here's what you get:

MS® OS/2, including the Windows presentation manager.*

A Microsoft C Compiler and Microsoft Macro Assembler for MS OS/2.

The MS OS/2 LAN Manager.*

Extensive documentation.

Microsoft™ OS/2

Continual updates of all the components, right up to final release date.

A year's subscription to a special MS OS/2 DIAL account (an online support and product information link to Microsoft).

Introductory video cassettes containing important information necessary to get started.

And, on a strictly first-come-first-served basis, a limited number of people will get a seat at one of our intensive training conferences in LA or Dallas.

The cost of all this is $3000.**

The opportunities, endless.

Microsoft®

To obtain your information packet and order form, call:

800 426-9400

Training conferences: LA, September 21-24. Dallas, October 20-23.

*Windows presentation manager and LAN Manager reference materials are included. The actual software will be shipped as free updates.
**Companies ordering more than three may purchase subsequent kits for $1500 each, excluding DIAL subscription and conference seats.

SOFTWARE & SERVICES

SOFT TALK

Mitch Betts

Pentagon gets personal

Finally, finally, the Pentagon is beginning to see the wisdom of considering the human factor when it designs weapons systems.

The most important benefit of this, of course, is to make it possible for real soldiers to successfully use today's high-priced high-tech weapons. But this welcome news also has an important side benefit: Government-funded research in human factors provides lessons in software design that should be just as useful to the private sector.

We've all read horror stories about "smart weapons" bought by the Pentagon for millions of dollars, whereupon the Pentagon finds out those weapons are virtually impossible for a soldier to use in battle. It may be a fighter jet with too many control switches, a missile that requires 18 steps to aim and fire or a tank with hatches so small that soldiers in winter gear can't climb in. With computer systems such as those found in jet cockpits, there are questions about whether the pilot can see all the screens and whether the system is providing too much information for the pilot to handle.

This is where the study of human factors — the capabilities and limitations of humans, relative to the systems they operate — comes in.

At long last, the Department of Defense is starting to consider human factors in the *early*

Continued on page 26

Information center role changes

Hospital finds it must support applications written by end users

BY ROSEMARY HAMILTON
CW STAFF

COLUMBUS, Ohio — As information center director at Children's Hospital here, Paul Jacobson was recently presented with a patient information management program that had been written by an end user.

Jacobson had to figure out how much responsibility to assume for this work, a challenge that was a far cry from his job of two years ago — teaching the basics of word processing and spreadsheets to uninitiated end users.

"This is a nonprofessional developer developing a critical application. It's a spaghetti code, and it isn't documented. But she wrote it, and it works. My concern is how we will support this effort," he says.

Paul Jacobson

Like many information centers, the one at Children's Hospital is struggling through a transitional period. Having achieved its original goal of promoting computer literacy among the hospital's employees, the center is now redefining itself in a world of increasingly sophisticated users, some of whom have produced finished applications. Jacobson says this process is difficult because there is no clearly defined next step for the information center.

"We've gone from relatively simple, stand-alone applications aimed at personal productivity to the need for complex ones aimed at work groups and departmental areas," he says.

This change has raised the question of how much of a role the information center should play in supporting more sophisticated users, Jacobson says.

"The traditional support organization for simple, single-user applications will have trouble handling the more sophisticated departmental issues," he adds.

The need for departmental

Continued on page 29

Industry giant faces fight from Canadian underdog

BY CHARLES BABCOCK
CW STAFF

TORONTO — A job scheduling package that users said offers more control over scheduling options is being pushed by a young Canadian firm to compete with the dominant products from Computer Associates International, Inc. and the former Uccel Corp.

Cybermation, a 6-year-old company in the Toronto suburb of Markham, is offering Release 3.5 of Execution Scheduling Processor (ESP), a $40,000 combination of two predecessor products: Dependent Job Control and Job Scheduling System.

Both products are used under IBM's MVS operating system, with the Job Scheduling System working in conjunction with IBM's TSO or with Applied Data Research, Inc.'s Roscoe. ESP was designed to work with IBM's JES2 or JES3 job entry environments.

Cutting the overhead

The Dependent Job Control component emulates the dependent job capabilities of JES3 for a JES2 shop, noted user Terry Burr, senior software consultant for Canada Systems Group, a service bureau with three data processing centers. Burr said his shop did not want all the overhead of JES3 but needed the job dependency capability and found it through the Cybermation product.

After rejecting IBM's Change Job Scheduler, "We were getting ready to write our own dependent job control program," when the firm learned of ESP, Burr recounted.

An ESP user in Greensboro, N.C., who asked not to be identified, praised the job scheduler component. He said he was able to train users in a 10-minute telephone conversation to define tasks and follow the procedures for executing those tasks.

"It's quite easy to assign a user to ESP. . . . Users identify their own needs and get on board very, very quickly," he said.

Whether these features will allow ESP to enlarge its small installed base of 60 licenses re-

Continued on page 27

Manager displays 10 screens

BY ROSEMARY HAMILTON
CW STAFF

RESTON, Va. — Software AG of North America, Inc. is set to introduce today a session manager with a windowing facility that the firm said will allow users to display up to 10 IBM VTAM applications simultaneously.

Net-Pass, which was designed for the IBM MVS, DOS/VSE and VS1 environments, is said to save users up to 10% of CPU resources by eliminating the need to log on and off as they move from one VTAM application to another.

A one-time license fee for DOS environments is $15,000. An MVS version costs $25,000, and a VS1 version has a $20,000 fee. The one-time fee includes the maintenance charge for one year. Subsequent maintenance charges are 15% of the current license fee.

The session manager has also been designed to work with Software AG's applications manager, Com-Plete. Users can run both products concurrently and can switch between the two with a single keystroke, company spokesmen said.

The windowing facility also

Continued on page 29

Inside

SSPS ramps up 9370 tools

Analysis, graphics, tables packages to run under VM/IS

NEW ORLEANS — At the recent Information Center Conference and Exposition held here, SSPS, Inc., based in Chicago, announced that it will make its mainframe and minicomputer products available on the IBM 9370 Information System running VM/IS.

SPSS-X is a comprehensive data analysis package that is produced by the company.

SPSS-X Tables, an option to the SPSS-X system, displays analysis results, according to the vendor.

SPSS Graphics can reportedly display information in 40 chart types, including pie, bar, line and regression charts.

In addition, the vendor said, SPSS Graphics has the ability to display maps and text pages as well as multiformat combinations.

SPSS-X Capture, an SPSS-X option, reportedly provides a bridge between SQL/DS query language and SPSS-X.

Initial licensing fees on the IBM 9370 for SSPS-X range from $3,000 to $5,000. SSPS-X Tables prices vary from $1,500 to $2,000. The graphics product costs $2,500 to $6,000.

Pentagon

CONTINUED FROM PAGE 25

stages of systems design, under a program called Manpower and Personnel Integration, or Manprint. Begun three years ago by the U.S. Army, the program is beginning to have a definite effect on military design practices, according to a recent article in the Institute of Electrical and Electronics Engineers' *Spectrum* magazine.

No longer flying blind

For example, the Army is developing the cockpit computer for the Light Experimental Helicopter by running simulator tests. The simulators show how pilots handle the work load and tell cockpit designers how to allocate the tasks between pilot and computer. According to *Spectrum*, the helicopter is expected to have just two or three CRT displays with simple menus (instead of row after row of gauges and dials), a voice-recognition control system and a helmet-mounted display conveying all the pictorial and digital information needed to fly it.

The military's research into human factors has produced some important lessons about the design of user interface software. The U.S. Air Force Electronic Systems Division contracted with human-factors experts at Mitre Corp. in Bedford, Mass., to develop guidelines for software design. The resulting product should be posted on bulletin boards in MIS shops everywhere.

The recommendations are contained in a handbook, *Guidelines for Designing User Interface Software*, by Mitre's Sidney L. Smith and Jane N. Mosier. Summarized below are six guidelines:

- Ensure that a user need enter data only once and that the computer can access the data if needed thereafter for the same task or for different tasks. This requires an integrated and flexible software design so that different programs can access previously entered data.
- Ensure that whatever data a user needs for any transaction will be available for a display. For example, header information should be retained or generated anew when a user is paging or scrolling through data tables.
- Provide flexible sequence control so that users can accomplish necessary transactions involving data entry, display and transmission or can obtain guidance in connection with any transaction. For example, the user should be able to go forward or backward at will when scanning a multipage display.
- Design standard procedures for accomplishing similar, logically related transactions. Standard procedures will facilitate user learning and efficient system operation.
- Ensure that data transmission functions are integrated with other information-handling functions within a system. A user should be able to transmit data using the same computer system and procedures used for general entry, editing, display and other processing of data.
- Whenever possible, provide automated measures to protect data security, relying on computer capabilities rather than on more fallible human procedures. This requires automated security measures — both to prevent intrusion by unauthorized users and to minimize data loss due to equipment failures and user errors.

Sure, this all sounds like common sense. But how many systems have you seen that actually follow all six guidelines?

AT LONG last, the Department of Defense is considering human factors in the *early* stages of systems design.

Betts is *Computerworld's* Washington, D.C., correspondent.

Alliant adds Ada to FX minisupers

LITTLETON, Mass. — Alliant Computer Systems Corp. has announced the availability of parallel-tasking Ada, the FX/Ada Development System, for its FX series of minisupercomputer systems. FX/Ada, an enhanced version of the Verdix Ada Development System, combines Alliant's parallel processing architecture with the parallel constructs inherent in Ada, the company said.

The FX/Ada language has allowed Boeing Co.'s Commercial Airplane Division to mix routines of different languages in the same program, according to Dilip Kumar, manager of the flight systems laboratory that is using the FX/8 minisupercomputer system to perform real-time flight simulation for a new medium-range 7J7 aircraft.

Kumar's staff is developing new code in Ada while also using existing Fortran and C routines, he added.

The FX/Ada Development System, including the compiler, screen-oriented symbolic debugger, library maintenance utilities, programming tools and runtime system, costs $13,000 for an FX/1 uniprocessor license and $41,000 for the FX/8 with one to four computational elements.

It costs $55,000 for the FX/8 with five to eight computational elements.

Industry giant

CONTINUED FROM PAGE 25

mains to be seen. Cybermation is expanding its six-man direct sales force but faces competition from the software industry's heavyweight. Computer Associates' move last June to acquire Uccel will give the resulting software company a near monopoly in the job scheduling package arena. Computer Associates' CA-Scheduler controls approximately 21% of the market, according to Computer Intelligence in La Jolla, Calif. The research firm estimated that Uccel's UCC-7 controls 69% of the market. Smaller players in the market include Southwest Software, VM Software, Inc. and Software Concepts, Inc., which together constitute an additional 9% of the market.

The North Carolina customer is a user of both ESP and UCC-7 and said he reserves UCC-7 for the large batches of production jobs. UCC-7 is more complicated to install and use, leaving many smaller jobs to be handled by the Cybermation product, he said.

In addition, the Cybermation job scheduler allows a user to test the definitions he used to determine when his job will run. With the command Next 10, he can get a display of the next 10 times his job will run.

The Dependent Job Control component manages the order in which jobs run so that a job that depends on the results of another does not run until those results are available. In addition, jobs may be submitted by remote centers, said Tina Rogers, Cybermation marketing manager.

"It's designed for users who don't know that much about data processing" and allows system operators to make modifications to existing schedules dynamically, she said.

Morino buys into BST, will link product lines

BY ROSEMARY HAMILTON
CW STAFF

VIENNA, Va. — Morino Associates, Inc. recently paid $1.5 million for a minority interest in Business Software Technology, Inc. (BST), a Westboro, Mass.-based maker of change control software, officials from both companies have announced.

Under terms of the agreement, both vendors will develop a product that links the BST product, Endevor, with Morino Associates' Information Systems product line, which includes 14 utilities to manage, monitor and analyze the IBM MVS and MVS/XA environments.

Endevor allows users to keep track of changes made in applications software. Endevor-DB, for instance, provides management tools to control development of applications used with Cullinet Software, Inc.'s IDMS/R data base management system.

Shares marketing rights

The alliance will also give Morino Associates the right to market BST products. Mario Marino, president and chief executive officer of Marino Associates, will join BST's board of directors.

The interface product does not have an availability date. "We've been strong in data centers, just made our entry into networking, and we've been working on ways to get into applications," Marino said.

Marino added that the alliance with BST is a "real good first move" in the firm's plans to grow as a systems software vendor.

The two vendors have done business together before. The Marino Associates performance monitor for IDMS/R was developed by BST.

Asked why Marino Associates did not acquire BST, Marino said, "They didn't have to sell."

Meet the perfect software companion for your PC.

It's your first look at a true PC/4GL. You see comprehensive menus and windows, powerful relational data base management, efficient 4GL reporting, and cooperative micro/mainframe information management.

You and RAMIS/PC Workstation, A Perfect Combination.

RAMIS/PC Workstation brings both novice and expert users all available options through helpful pop-up windows or through expert paths. So users are never frustrated with syntax, and are productive immediately, no matter what their experience.

An advanced relational data base management system combines with a 4GL report generator to create high performance, stand-alone PC applications. And, the applications you develop can be used at your PC or on the mainframe.

You can automatically convert PC applications to run with mainframe RAMIS Information System. You decide which processing environment is best at any stage of an application's life cycle—PC, mainframe, or a combination of the two.

It's the only true PC/4GL.

You can't find a more compatible 4GL, and a better match for your PC software.

Through its menu selections, RAMIS/PC Workstation allows you to automatically convert uploaded/downloaded data, or import/export data from PC spreadsheets, graphics, and word processing programs for immediate use.

Data from your favorite PC software like Lotus 1-2-3,® dBASE III,® MultiMate,® Chart-Master,™ and many others can be used without intermediate conversions or incompatibility. And, you can exchange data between the PC and the mainframe, too. You simply choose options from menus and windows. The tasks of conversion and file creation are done automatically!

This is your chance!

Now is your opportunity to meet the perfect PC/4GL, simply by letting us know what you consider the perfect PC/4GL is. And, when you do, you could win a free RAMIS/PC Workstation!

All you have to do is write a personal ad describing what you need from the perfect PC/4GL to do your job better, and send it to the address below. Contest entries will be judged on how creatively you define your specific needs. Don't forget to include your name, title, company, address, and phone number, so we can let you know if you've won.

Send your personal ad to: RAMIS/PC Workstation PC/4GL Contest, On-Line Software International, Inc., Box 2392, Princeton, NJ 08540, Attn: Marketing Communications. All personal ads should be postmarked no later than September 15. Winner will be notified in writing.

Find out more about RAMIS/PC Workstation or any of our other products at a free seminar offered in your area. Call or write On-Line Software International, Inc., Two Executive Drive, Fort Lee, NJ 07024. Service Bureau, VAR and OEM programs are available.

800·642·0177

In Canada: 416·671·2272/In Europe: 44·1·631·3696

On-Line Software International

Authorities in IBM® Software

RAMIS/PC Workstation. *The PC/4GL Information Management System for All Users.*

Info centers

CONTINUED FROM PAGE 25

solutions requires far more technical expertise than the information center's past responsibility of bringing employees up to speed on personal computers. Yet, departmental support also requires heavy involvement with these users, which is often unfamiliar territory for the traditional data processing team.

What Jacobson says he sees evolving is a blurred distinction between the traditional DP department and the information center. As user issues become increasingly complex, the expertise of both groups will be needed.

Jacobson's theory is backed up by Children's Hospital's assistant vice-president of information systems, J. Malcolm Murray, who oversees both departments. "We try to have different types of people under one management group," he says. "Keeping the information center separate from DP has been a major concern. DP is very much involved in the process of systems requirements and definitions. The information center is much more interactive. We'll always have a need for 'people persons,' as opposed to technical specialists."

Partnership

Jacobson says he expects to work more closely in the future with the DP manager to address departmental needs. Eventually, he adds, end-user computing needs will no longer be considered the isolated problem of the information center. "The director of DP and I now see ourselves as partners," Jacobson says. "By all of us reporting to Malcolm, we can bring a wide suite of disciplines to bear on information problems."

Just how all this will fall into place remains to be seen. Because it is an evolving process, the role that each segment of the information systems department plays is now being decided on a case-by-case basis.

The information center, for instance, took charge in the recent case of an end user — an office manager from the hospital's gastroenterology department — who developed her own application. The information center staff and the end user together developed a four-page work plan "that will take her to full implementation," Jacobson says. The plan took seven hours to develop and will help this user rewrite the program for a multiuser environment.

Manager

CONTINUED FROM PAGE 25

allows users to transfer a screen of data from one application to another, a spokesman said.

Net-Pass, a menu-driven system, includes a response-time monitor that records data on the transactions of active applications, including the number of transactions, the average time of each transaction and the maximum time of all transactions.

The session manager offers a broadcast facility that is said to allow users to send messages to other users, who can receive them regardless of the application they are currently running. Software AG said the product supports commonly used security software products.

Index Technology ties in to Parsophic's Telon

CAMBRIDGE, Mass. — Index Technology Corp., a maker of computer-aided software engineering tools, recently said it will offer an interface product to the Pansophic Systems, Inc. code generator, Telon, later this quarter.

The $9,000 link, XL/Interface Telon, will allow screens and report designs from Index's Excelerator product to be transferred directly to the Telon environment, the company said.

Telon, which generates either Cobol or PL/I code, is often used in developing on-line information systems that require multiple screens and reports. Pansophic specified a transfer format to which Index designed the interface product.

According to Richard Carpenter, president of Index, XL/Interface Telon is the "first in a series of interfaces to applications generators.

"We picked Telon first because, overall, it was the most requested by our customers," Carpenter added.

He said that many of the company's users currently use their own bridges to link the Excelerator design software to the Telon environment. But the majority of users will "pass on the specifications to the Telon programmer who re-enters it. Clearly, there's a little value added here," he said.

"The objective here is to automate more of the software development life cycle," said Sue O'Brien, Pansophic's product manager for Telon. O'Brien said the Pansophic-designed transport facility, which specifies the format for data to be used in the Telon environment, will be part of the Index offering. However, it will be wrapped into the next major release of Telon, scheduled for mid-1988.

According to O'Brien, XL/Interface Telon will allow users to pass on the early design work to Telon, enabling them to "pick up work in Telon at a later step [in the design cycle] and eliminate duplication."

NOW YOU CAN HAVE THE MODEM YOU'VE ALWAYS WANTED AT A PRICE YOU NEVER DREAMED YOU COULD GET.

Hayes

NEW PRODUCTS

Systems software

Template Graphics Software has ported its implementation of the Programmer's Hierarchical Interactive Graphics Standard to Apollo Computer, Inc., Masscomp, Silicon Graphics, Inc., Sun Microsystems, Inc. and Digital Equipment Corp. GPX workstations.

The software, **Figaro**, is a device- and computer-independent graphics standard designed for two- and three-dimensional graphics applications requiring hierarchical data structures, geometric modeling, rapid display modification and interactive input.

License fees for Figaro software on the Apollo, DEC, Masscomp, Silicon Graphics and Sun workstations start at $3,000.

Template Graphics Software, 9685 Scranton Road, San Diego, Calif. 92121.

Applications packages

Libra Programming, Inc. has released a line of construction accounting software for the Digital Equipment Corp. family of VAX computers.

The **Libra Construction Package** includes integrated software modules for accounts payable, accounts receivable, billing, general ledger, inventory, job costing, order entry, payroll and property management.

Prices range from $1,950 to $4,890.

Libra Programming, 1954 E. 7000 South, Salt Lake City, Utah 84121.

Languages

Whitesmiths, Ltd. has announced its **Version 3.2 C Compiler** for Digital Equipment Corp. VAXs running VMS.

Features include C source-level interactive debugging with breakpointing and variable display and improved code generation. The compiler also produces compiler and assembler source listings, including the ability to display high-level source code on one listing.

Standard C features include structure assignment, structure-as-function arguments and functions-returning structures.

The Version 3.2 C Compiler is priced from $1,500.

Whitesmiths, 59 Power Road, Westford, Mass. 01886.

Utilities

Version 2 of DBaid, a menu-driven productivity tool for use with the IBM IMS Data Base Recovery Control (DBRC) feature, has been announced by **Financial Technologies International, Inc.**

DBaid for DBRC operates under IBM's ISPF and generates DBRC cards and executes DBRC in foreground or background mode.

The permanent license fee for DBaid is $15,000.

Financial Technologies International, 46th Floor, One World Trade Center, New York, N.Y. 10048.

Development tools

An automated extension of the Pride Information Systems Engineering Methodology, which is said to provide automated assistance during the design or modification of an information system, has been announced by **M. Bryce & Associates, Inc.**

Automated Systems Engineering for system design is used as a computer-aided design tool. It interprets specifications developed from the Pride chronological decomposition technique and then generates a design, including the application's logical data base design. It can design interactive, batch, office automation or computer-assisted systems. Supporting documentation can be generated.

The Pride products are available on such mainframes as IBM's MVS and MVS/XA and Digital Equipment Corp.'s VAX/VMS. Prices start at $110,000.

M. Bryce & Associates, 777 Alderman Road, Palm Harbor, Fla. 34683.

NO MATTER WHAT LANGUAGE OR DATA BASE PRODUCT YOU ARE USING — IF IT ISN'T CLARION, YOUR APPLICATIONS ARE TAKING TOO MUCH TIME TO WRITE.

CLARION:

- *saves development time*
- *increases programmer productivity*
- *lowers development costs*
- *yields better, richer applications for single users or a network of users*

THE CLARION ADVANTAGE

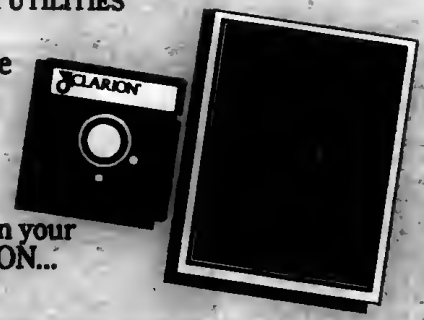
- POWERFUL MODERN LANGUAGE
- ADVANCED DATA BASE MANAGEMENT
- SCREEN and REPORT GENERATORS
- FAST COMPILE and TEST
- INTEGRATED FAMILY of UTILITIES

IF... your commercial microcomputer applications are written in Assembler, BASIC, C, COBOL, Pascal or any of the data base languages...

AND... you have simply run out of time... or programmers... or money...

THEN... you owe it to yourself and to those who depend on your professional skills — to make the easy move to CLARION...

ELSE... you'll miss out on the CLARION advantage.



CLARION is priced at $395 plus shipping. It runs on any IBM PC, XT, AT or true compatible with 320KB of memory and a hard disk drive.

CLARION®
from BARRINGTON SYSTEMS, INC.

To order CLARION or to get our free 16-page brochure and the Sample Program diskette, simply call TOLL FREE...

1-800/354-5444

150 EAST SAMPLE ROAD POMPANO BEACH, FLORIDA 33064-3597 305/785-4555

SMALL TALK

William Zachmann

Prime rates a thumbs-up

It isn't very often that I get truly excited about a new product, particularly one from a minicomputer vendor. But then, it isn't often that a product from a mini vendor is based on a standard microprocessor and has lots of highly innovative features.

Prime Computer, Inc.'s EXL 316 is just such a product. It's based on a standard 16-MHz Intel Corp. 80386 microprocessor. Running Prime's System V Interface Definition, compatible with AT&T's Unix System V, Release 3, the EXL 316 notches benchmarks of 3.2 million instructions per second, according to Prime.

The EXL 316 would be an interesting product even if it were simply a 386-based multiuser system running AT&T's Unix System V, Release 3. It's an important development that s traditional minicomputer vendor should introduce a powerful product based on a standard microprocessor.

What makes the EXL 316 an exciting product, however, is

Continued on page 34

Chip set pits AT against PS/2

Chips and Technologies claims revamped 20-MHz CPU a match for 386

BY ED SCANNELL
CW STAFF

MILPITAS, Calif. — Chips and Technologies, Inc. last week unveiled a 16-MHz IBM Personal Computer AT-compatible chip set it said will make the AT and compatibles effective price/performance competitors against IBM's Personal System/2 during at least the next two years.

Chips and Technologies also introduced an IBM Video Graphics Array (VGA) chip set that, at $40.50 in quantities of 1,000, is priced the same as its IBM Enhanced Graphics Adapter (EGA). The company said its EGA users can upgrade immediately and are eligible for volume discounts.

The CS8221 New Enhanced AT chip set, or Neat, is centered around Advanced Micro Devices, Inc.'s (AMD) 16-MHz CPU, which is based on Intel Corp.'s 80286-16. It can be upgraded to 20 MHz and offers a 70% improvement in throughput over 10-MHz 80286-based systems with one wait state and is "nearly equivalent" in performance to current 80386-based systems, according to Ed Huber, AMD's director of marketing.

Besides the CPU, Neat consists of a bus/clock controller, an interleaved page-mode controller, a peripheral controller and an address data buffer. The chip

Continued on page 34

Motorola chips away at 386's edge

With so much attention focused on Intel Corp.'s 80386 microprocessor during the past year, many corporate users are perhaps unaware of competing 32-bit chips, including Motorola, Inc.'s 68020.

While Intel's family of chips generally drive Microsoft Corp. MS-DOS-compatible personal computers, Motorola's 68000 family has thus far been the chip of choice for multiuser Unix systems and technical workstations. With a faster 68030 on the way and MS-DOS software emulators already on the market, Motorola officials say their chips' dominance can extend to PCs as well.

Jack W. Browne Jr., Motorola's manager of 68000 marketing, and Jeff Nutt, 68000 technical marketing manager, recently discussed the 32-bit systems market with *Computerworld* senior writer David Bright.

Marketing managers Jeff Nutt and Jack W. Browne Jr.

The 68000 family's main competition is obviously the 80386. How does the 68020 stack up performancewise against the 386?

Browne: The 68020 at the same clock speed as the 386 is about 20% faster. The 386, as I understand it, is in the marketplace at 16 and 20 MHz. So we have 12, 16, 20 and 25 MHz. Our 12-MHz part is roughly the same performance as Intel's 16-MHz part. So that gives us a broader range. With the 68030, the first products that go into manufacturing will be 16 and 20 MHz.

Nutt: One of the things that Intel does is they make a lot of benchmark claims of their own.

Continued on page 36

Old pro 8088 soldiers on

Price, reliability fuel aging CPU's success

BY JULIE PITTA
CW STAFF

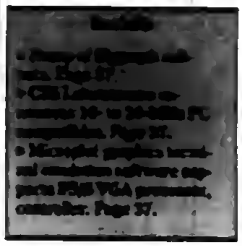
Despite the razzle-dazzle introductions of systems based on Intel Corp.'s powerful 80286 and 80386 microprocessors this year, manufacturers of Intel 8088-based personal computers continue to report brisk sales.

While the home and the classroom are natural environments for these older PCs, some corporate users are still looking at 8088-based systems as low-cost solutions for less demanding applications.

Last year, 3.9 million 8088-based PCs were shipped domestically, compared with 1.3 million 80286-based systems, according to Dataquest, Inc., a San Jose, Calif., market research firm.

While the momentum will shift from 8088- to 80286-based systems this year, 8088-based machines are nonetheless expected to outsell their 286-based

Continued on page 35



Prime

FROM PAGE 33

Prime's bold and forward-looking move in incorporating Locus Computing Corp.'s Merge/386 and PC-Interface software as part of the product offering. As far as I know, the EXL 386 is the first commercially available system on which Merge/386 and PC-Interface are available.

Wears many hats

The EXL 316 is more than just a Unix system; it's a Unix system on which one or more users have the option of running Microsoft Corp.'s MS-DOS from their terminals in addition to, or instead of, Unix System V, Release 3. It is also a Unix system that, via a local-area network (LAN) connection, can make the entire Unix file structure available to one or more micros running MS-DOS or IBM's PC-DOS over a LAN.

Currently, I have an EXL 316 on loan from Prime with two terminals on it. The 10-MHz Wyse Technology WysePC 286 that I regularly use in the office is also connected to the EXL 316 via Ethernet. When I first brought up the whole system, I used the PC-Interface to connect the PC to the EXL 316.

All that is required on the PC are two Ethernet device driver (*.SYS) files loaded through the DEVICE= command in the CONFIG.SYS file and the PC-Interface software. LOGIN.EXE is used with three parameters to initiate the connection to the EXL 316. From then on, Unix files on the EXL 316 appear as DOS files on my F: disk.

Once connected, using the PC-DOS XCOPY/S command, I simply copied the entire contents of my C: disk to the F: disk. Access to the hard disk on the EXL 316 over the Ethernet connection was nearly as fast as accessing my local hard disk on the WysePC 286.

After logging off the USER1 account via the PC-Interface over Ethernet, I was able to log on to USER1 as a regular Unix account on one of the terminals connected to the EXL 316. The DOS directories and files I'd copied from my C: disk on the PC could then be in the /USR/USER1 directory.

Then, by typing the Merge/386 command DOS, I could start MS-DOS directly under Unix on the terminal attached to the EXL 316. It comes up in the DOS C: USR/USER1 directory.

The bottom line is that Prime's EXL 316, equipped with Merge/386 software and connected to personal computers with PC-Interface software, provides a spectacular array of options for moving between DOS and Unix.

Zachmann is vice-president of research at International Data Corp.

Chip set

FROM PAGE 33

set uses CMOS technology, which should help bring AT compatibility to new markets — including the laptop area — according to Raj Jaswa, senior product marketing manager at Intel.

EMS a Neat feature

Neat integrates the Lotus/Intel/Microsoft Expanded Memory Specification (EMS), a capability currently not available in the PS/2 series, according to a Chips and Technologies spokesman. The product is compatible with Microsoft Corp.'s MS-DOS and IBM's PC-DOS in addition to IBM and Microsoft's OS/2 operating system, he said.

With most users planning to operate under MS- and PC-DOS for the next few years, memory above 1M byte has had little value in current implementations. Systems centered around Neat, however, treat memory above 1M byte as EMS, which can be useful for applications requiring large data storage, such as Lotus Development Corp.'s 1-2-3.

Access to EMS will be useful for AT and compatible users running OS/2, Intel's Jaswa noted, because it is so memory-intensive. The multitasking operating system, together with IBM's Presentation Manager, will require about 1.5M bytes of memory just for the program code.

OS/2 for the masses

"A lot of people think OS/2 will be running only on PS/2, but as several compatible makers have recently made clear, OS/2 will also be running on AT-type machines," Jaswa said.

Chips and Technologies made Neat fully bus-compatible with IBM's PC XT and AT through a technique called dynamic bus-clock switching that allows the bus to run asynchronously with the processor. Therefore, if an add-on card responds at 8 MHz, a user can continue to run his AT at 12 or 16 MHz.

Another technique used to make the chip set compatible was configurable command delay, which allows time for add-on cards to respond. The bus will provide 12.5-MHz, one-wait state throughput and still maintain compatibility, according to the company.

Gets along with VGA

The CS8245 VGA chip set works with all the modes used in IBM's recently announced VGA, which is used in the PS/2 Models 50, 60 and 80. The two-chip set also supports IBM's 31.5-KHz analog monitors as well as currently used EGA, Color Graphics Adapter, Hercules Computer Technology, Inc., NEC Corp. Multisync-type and monochrome monitors.

The VGA chip set operates at a standard clock frequency of 30 MHz with a 38-MHz option available. The product provides graphics resolution of 1,024 by 768 or 800 by 600 pixels. Evaluation samples are currently available, according to Johanna Ohlsson, the product's marketing manager.

The Neat chip set costs $108.90 for the 12-MHz version and $136.80 for the 16-MHz edition in quantities of 100. Like the VGA chip set, Neat is available in evaluation samples. The product will be available in production quantities in November, the vendor said.

Old pro 8088

FROM PAGE 33

counterparts this year, according to Norman DeWitt, a Dataquest analyst. He predicts that 4.8 million 8088-based systems will be shipped, compared with 1.3 million 286s.

While PC makers concede that the 286 will, in the words of one manufacturer, be "the chip of the decade," they report that demand for 8088-based machines is healthy. Michael Amadio, director of computer products at Cordata, Inc., says demand for his firm's 8088-based PCs is three times greater than the firm forecast this year. He declines to state actual shipment figures.

"When what you want it to do doesn't require a 286, customers will stick with a proven technology," Amadio says. "Sometimes I wonder if people just aren't more comfortable with what's already out there. We in the industry are always looking toward the newer and greater, but I don't think that's always the case with the user."

In what serves as a tribute to the viability of 8088 technology, a number of manufacturers have introduced microcomputers in that class in recent months — among them Tandy Corp., Zenith Data Systems and Cordata. Manufacturers have enhanced their 8088-based PCs to improve on the earlier models' storage capabilities, processing speeds and screen resolutions.

The primary appeal of the 8088-based machines seems to be their relatively low cost.

It takes you there

"Why do you drive a Toyota rather than a Corvette? It's because what you drive takes you there," says Ed Juge, director of market planning at Tandy.

Corporate users are employing 8088s as nodes in local-area networks (LAN) and as workstations for simple word processing and the occasional spreadsheet.

Marge Lakin, manager of operations administration at motorcycle manufacturer Kawasaki Heavy Industries, Ltd., says her company purchased 900 8088-based PCs from Zenith late last year. The PCs are being used in a network linking dealers to Kawasaki's U.S. headquarters in Irvine, Calif.

Through the use of the PCs, dealers may order parts from Kawasaki's corporate headquarters. "The technology is fine for what we're doing," Lakin says. "And cost was a consideration."

However, Tom Eagan, vice-president of office systems at Wells Fargo Bank NA, says his company opted for 80286-based IBM Personal Computer AT compatibles in the bank's network, which links its loan officers to corporate headquarters. "The crystal ball as we see it led us to the 286," Eagan says. "It affords us a longer life cycle. Applications using artificial intelligence, for example, will [make] obsolete the 8088." However, Eagan says he will not discard the company's 150 8088-based PCs.

The expected decline in prices of 286-based PCs will cut deeply into the market for 8088-based systems. How long the 8088 PC will survive is a question open to debate.

"I think it will survive well into the 1990s," Dataquest's DeWitt says. "It'll shift into different markets — it'll probably become stronger in homes and schools — and the shipments will begin to decrease."

Others, however, are not so optimistic.

"I think there's a future for the 8088. It's a question of where and for how long," says Steven Holtzman, director of systems marketing at Wyse Technology. "By 1989, the price of the 286 should come down enough so there will be little rationale for anyone to continue buying an 8088."

Motorola

FROM PAGE 33

Motorola doesn't make too many benchmark claims of its own.

They've also come out with a hardware graphics controller. We don't need one. The 68020 *is* the graphics controller. The 68000 has bit-manipulation instructions. The 386 does not.

So in addition to the basic speed difference, there are other important differences as well?

Browne: Yes. [Differences include] the bit-manipulation instructions, the addressing modes and the general-purpose registers.

Nutt: What really upset us was Intel's claim that the 386 has general-purpose registers. I can prove to you that they only have one or two general-purpose registers. It is exactly the same dedicated register set as the [Intel] 8086. All they did was extend it to 32 bits. It's crazy. Nobody looked at it. They take the word of Intel.

When will the 68030 ship in volume and start appearing in systems that end users can buy?

Browne: We go into manufacturing in the fourth quarter, and I expect the ramp to be much, much faster. I expect to see products show up in the marketplace during the fourth quarter from a number of the smaller firms that move very rapidly into the marketplace. Concerning the larger firms, we've already had statements from NCR [Corp.]'s Tower group, Sun Microsystems, [Inc.] and John Sculley at Apple [Computer, Inc.] that the 68030 will be integrated into their product lines.

Clearly, a major problem for Motorola is that MS-DOS was written for the Intel family, not the 68000 series of chips. Now that IBM and Microsoft are writing OS/2 for the Intel 80286, how can you combat that problem?

Nutt: First of all, OS/2 for the 286 is possibly coming out in mid-1988. So that would be written for the protected mode of the 286 and not utilize the 32-bit environment. The 386 32-bit environment would not be available until 1989, and the applications for that won't be available until 1990. Our customers can't wait that long.

But they say, "I'd like to be able to offer my customers MS-DOS capability." To date, the only way that has been solved is by add-in 286 cards. Those are expensive solutions. They're $2,000 to $5,000. Now, we've worked very closely with two vendors: Phoenix Technologies Ltd. and Insignia, based in the UK. Those companies have basically developed emulation software that runs on the 68020 that totally emulates the IBM Personal Computer. So you can take MS-DOS and run it directly.

Sun has relied on the 68000 family for its workstations but recently introduced a high-end workstation built around a 10 million instructions per second, reduced instruction set computing (RISC) chip. Why would Sun, or any other workstation vendor, need to look outside Motorola's 68000 family for its processors?

Browne: Sun is a computer company, and they see their competitors as [Digital Equipment Corp.] and IBM. If you're going to compete, you're going to compete with the players. So Sun's looking at a broad range of price/performance. As they announced their RISC efforts, which they said they'll ship this year, they said that the 68000 family would continue to be the workhorse for them.

NEW PRODUCTS

Systems

A 16- to 20-MHz, zero-wait state IBM Personal Computer-compatible microcomputer has been announced by **CSS Laboratories, Inc.**

The **CSS 386 Personal Computer** features one 32-bit memory slot and five 16-bit and two eight-bit expansion slots. On-board memory starts with 1M byte of static-column random-access memory upgradable to 2M bytes.

The CSS 386 Personal Computer is priced at $2,495.

CSS Laboratories, 2134 S. Ritchey St., Santa Ana, Calif. 92705.

Software utilities

Graphics terminal emulation software designed to support the IBM Personal System/2 Video Graphics Array graphics processor and video controller has been announced by **Microplot, Inc.**

PC-Plot-IV Plus offers such graphics capabilities as 256 colors, a graphics screen dump to Hewlett-Packard Co. Laserjet printers and ASCII and Xmodem file transfer. It is said to enable the personal computer to appear to a mainframe as a Digital Equipment Corp. VT100, VT200 or VT52.

The user can exit PC-Plot-IV Plus leaving the remote host connection intact and run other IBM PC-DOS applications.

PC-Plot-IV Plus is priced at $225.

Microplot, 659H Park Meadow Road, Westerville, Ohio 43081.

NEW AT SIGGRAPH

An IBM Personal Computer AT-based graphics-controller card featuring four internal pixel planes with resolutions of 1,280 by 1,280 pixels each was announced by **Kontron Electronics, Inc.** The **7000CB** card is priced from $2,995. Kontron, 630 Clyde Ave., Mountain View, Calif. 94039.

The **Xcel-8000**, an Intel Corp. 80386-based presentation-graphics design and production system said to combine a design station with an imaging management station, was announced by **Autographix, Inc.** Prices start at $150,000. Autographix, 100 Fifth Ave., Waltham, Mass. 02154.

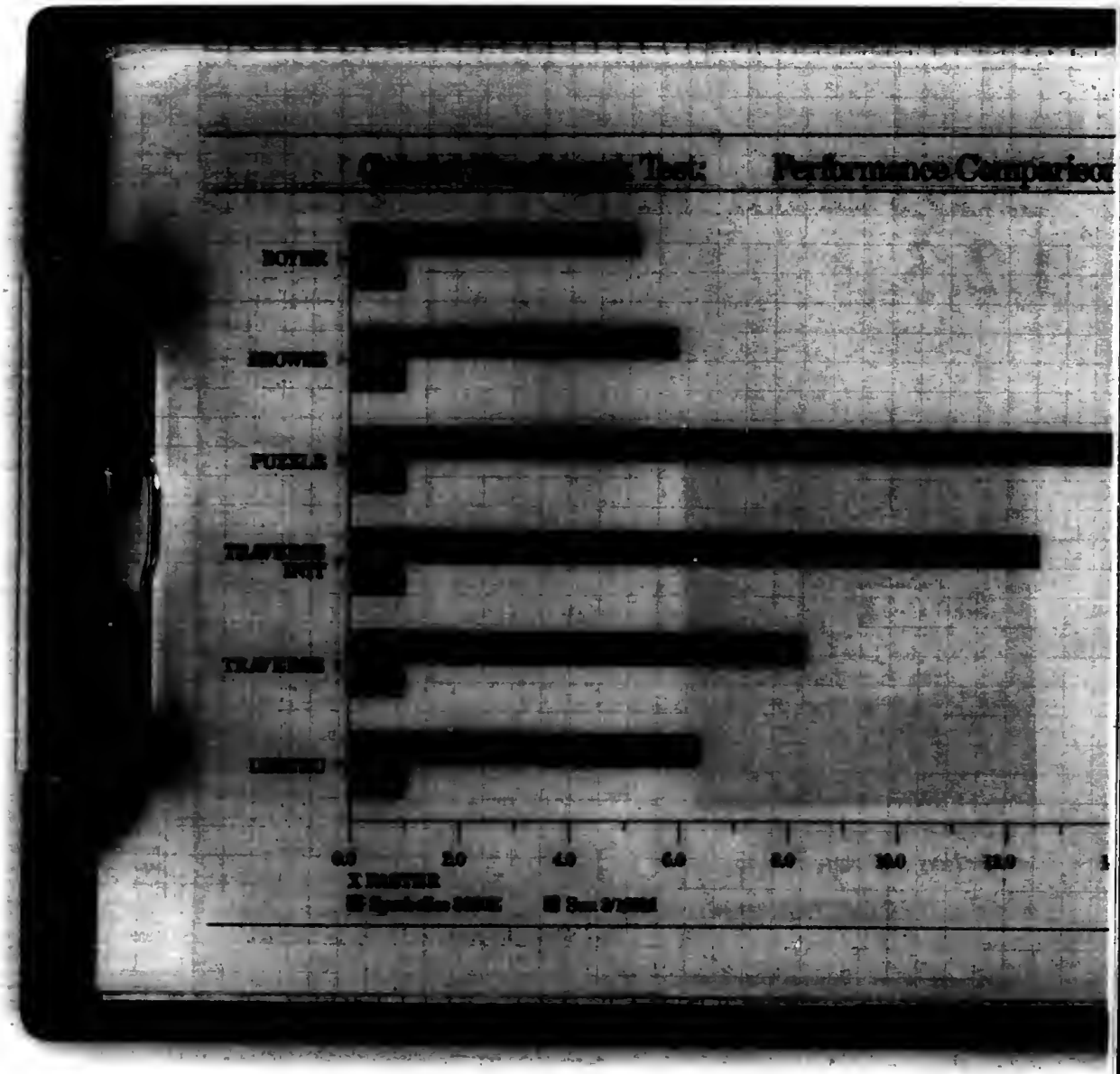
An AT-compatible arithmetic frame grabber, said to store and process up to 16 512- by 512- by 8-bit images in real time, was announced by **Data Translation, Inc.** The **DT2861** costs $4,995. Data Translation, 100 Locke Drive, Marlboro, Mass. 01752.

A single-board coprocessor family for the AT, said to execute computation-intensive vector and scalar operations at speeds of up to 20 million floating-point operations per second, was announced by **Mercury Computer Systems, Inc.** The **MC3200 Series** is priced from $6,500. Mercury, 600 Suffolk St., Lowell, Mass. 01854.

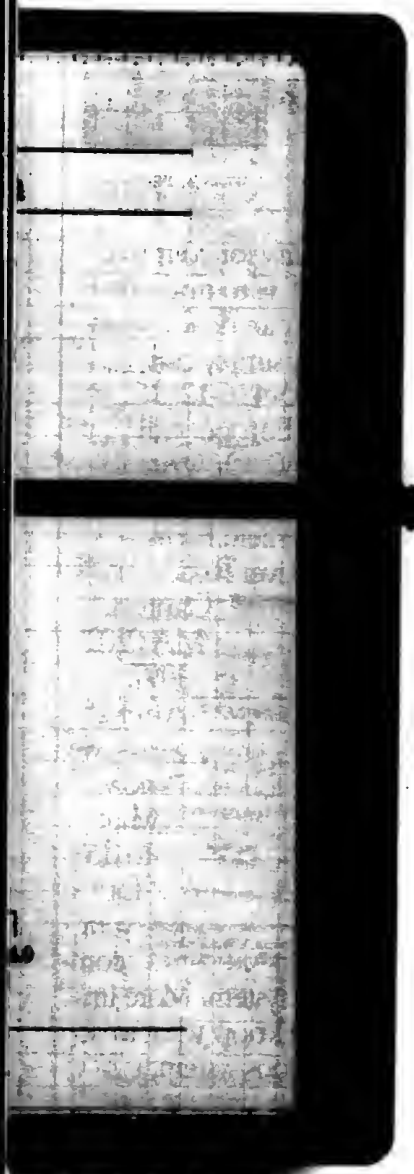
Wingraph, a Microsoft Corp. Windows-compatible presentation-graphics program, was introduced by **Media Cybernetics, Inc.** It is priced at $99.95. Media Cybernetics, Suite 2000, 8484 Georgia Ave., Silver Spring, Md. 20910.

Image capture and paint capabilities have been added to the **Starburst** AT-based graphics workstation, **Pansophic Systems, Inc.** has announced. The basic Starburst system costs $32,500. The image-capture option price starts at $12,000. Pansophic, 709 Enterprise Drive, Oak Brook, Ill. 60521.

What do you exp



pect for $36,000?



From Symbolics, you can expect the fastest AI and advanced software development workstation in its class.

To prove this, we matched our 3620E in a standard benchmark test with a representative workstation from the same class.* The results, as you can see, weren't even close. Symbolics ran anywhere from 5 to 34 times faster in every category.

Why Symbolics is so fast

Like other manufacturers, Symbolics supports IEEE 32-bit floating point and numeric processing. But we go a step further by adding four turbo-charged bits. When combined with our unique hardware architecture, these extra bits allow Symbolics workstations to compact applications data, automatically process different datatypes with built-in error detection, and process multiple operations in parallel for faster operation—faster than any other systems in their class.

In the real world of applications development, the true test of any system is not only its speed, but more importantly, the reliability of the information it processes. With all other systems, to get speed you must sacrifice the assurance of reliability. Only Symbolics gives you both.

What Benchmarks won't show you

Benchmarks only measure processing speed. The key ingredient to faster software development is programmer productivity. With Symbolics systems, programs can be developed from 5–50 times faster than with conventional workstations. That's because Symbolics' Genera™ software environment provides over 40 times as many built-in facilities as systems offering just a Common Lisp compiler. These pre-written "mini programs" shorten development time and increase reliability since programmers don't have to write them.

And Symbolics offers automatic data-type checking at run-time, advanced debugging, smart garbage collection, automatic memory management, the fastest edit-compile-debug loop available, and full support of object-oriented programming. These allow for rapid prototyping, and enable programmers to solve complex problems faster than ever.

Fast, reliable team-oriented software development

Symbolics also offers the fastest team-oriented software development—*even in multi-vendor environments.* That's because Symbolics supports a full range of industry standard protocols and languages to integrate AI into existing environments. With one simple command you'll access information from, and communicate *transparently* with UNIX,™ Digital, and IBM® systems. And using Symbolics workstations, you'll write software fast, in Common Lisp, Prolog, Fortran-77, Pascal or Ada.®

X34

Best price/performance

Getting up to 34 times the performance from Symbolics won't cost you more. In fact, Symbolics lists for less than most other systems in every class. And as you go up in class, the price difference becomes even greater.

Give us a call today. We'll tell you how Symbolics can greatly reduce your time to market for new products, and your costs, through increased programmer productivity and the best price/performance workstation available.

Symbolics. 11 Cambridge Center, Cambridge, MA 02142.

1-800-237-2401

In Colorado: 1-800-233-6083

*Comparably configured and priced systems.

symbolics™

For 25 years, our networks have prevented gray hair, cured ulcers and lowered blood pressure. Oh yes, and improved communications.

As a communications manager, you want a networking company that can eliminate your communications problems. And the stress that goes along with them.

Which is why we suggest you turn your problems over to a company that has been doing that since 1962. Codex.

When we say we wrote the book on networking we mean it. Literally.

We're the preferred vendor in the industry. In the most recent *Data Communications* magazine subscriber brand preference study, for example, Codex was cited as the number one choice for networking products ranging from multiplexers to modems to network management systems.

That's why 97% of the Fortune 100 depend on Codex for networking answers.

You see, we've spent the past 25 years working with people like you to address connectivity issues, analyze growth options, balance transmission costs against increased user demands, and keep up with rapidly changing standards and technologies.

We know that your company probably already has hardware commitments and investments that can't simply be discarded.

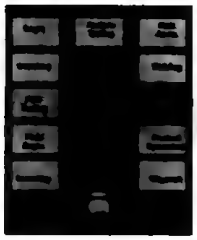
That's why we work within multivendor environments. So regardless of which vendors the pieces of your network come from, or where they are, we have the experience to maximize their performance and functionality.

And we continue our active involvement with industry standards committees, helping to create an "open architecture" that will help you link equipment in the future.

All this experience in the field of networking has given us enough knowledge and understanding to write a book.

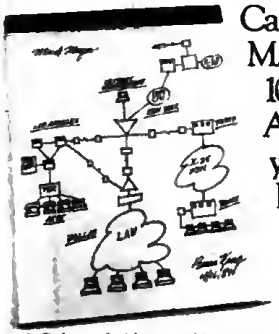
So we did.

The Basics Book of Data Communications is an informative guide to the ins and outs of networking.



When you call Customer Service, you've got the whole company on the line.

To qualify for your free copy, as well as to find out what Codex can do for *your* applications, simply call Codex **1-800-426-1212, Ext. 252.** In Europe, call 32-2-6608980. Or write to Codex Corporation, Dept. 707-52, Maresfield Farm, 7 Blue Hill River Road, Canton, MA 02021-1097. After 25 years, we know what to do for your communications system. More importantly, we know what to do for your nervous system.



At Codex, we don't have set solutions – we work with your current environment. Which is why we spend a lot of time drawing diagrams like this.

codex

MOTOROLA

The Networking Experts

Visit Codex at TCA September 29-October 2, booth # 228-231.

DATA STREAM

Clare Fleig

LAN vendors linking up

As users move from stand-alone departmental local-area networks (LAN) to company-wide communications systems, traditional LAN vendors are increasingly turning to mergers and strategic alliances as a way to meet their customers' complex needs.

Corporate networks often consist of multiple interconnected LANs that provide enterprisewide connectivity services, including access to telecommunications networks and corporate hosts. This requires integration of a wide variety of products, including IBM Personal Computer LANs, Transmission Control Protocol/Internet Protocol networks that connect multiple hosts, micro-to-mainframe links and telecommunications gateways.

But until recently, vendors specialized in one or two of the above products. As a result, LANs that were generally billed as solving all of the corporation's ills more often than not contributed to MIS headaches. Even when they worked smooth-

Continued on page 43

Banks moving toward EDI services

Aim to capitalize on investments in corporate communications links

BY MITCH BETTS
CW STAFF

The nation's largest banks are preparing to stake out positions as vendors in the blossoming electronic data interchange (EDI) industry.

The banks want to provide EDI services for their corporate customers during the next two or three years, according to Michael T. Manion, manager of treasury services in the Chicago office of Coopers & Lybrand, an accounting and consulting firm.

Some banks view the move into EDI as a defensive strategy necessary to retain their role as intermediaries for corporate financial transactions. Others may develop EDI products as part of an aggressive strategy to offer a variety of computer-based business services, Manion said.

Twelve major banks recently hired Coopers & Lybrand to study the EDI market, which uses the ANSI X.12 data communications standard to exchange orders and invoices as well as handle other transactions between companies.

"The main thrust of the study is to determine what corporate customers' requirements are in EDI, what opportunities there are for banks to provide EDI services and then to give bankers the information they need for product planning and development purposes," said Manion, who is coordinating the study.

Due Sept. 3, the report will be

Continued on page 46

CORPORATEWIDE NETWORKS

Sears cashes in with SNA

BY JEAN S. BOZMAN
CW STAFF

In the light of IBM's Systems Network Architecture (SNA), Sears, Roebuck and Co.'s Communications Network has done everything right. During the last three years, the Chicago-based company forged a private network throughout the continental U.S., Hawaii and Puerto Rico using state-of-the-art IBM architecture.

Key elements of the network seem as up-to-date as IBM's June announcements on network architecture. IBM's Netview is the glue that links 60,000 devices nationwide, including 50 IBM 3720s, 105 IBM 3725s, 2,000 Series/1a in 800 Sears stores and 100 host computers in 35 data centers. Eighteen months ago, before IBM's strategic alliance with Network Equipment Technologies Corp. (NET) was announced, Sears began to add T1 multiplexers from NET to its network. There are now 18 such sites nationwide.

Sears' Weis

In fact, the network could not have been built without IBM's active cooperation, say those who designed it. "We have a partnership relationship with IBM," says Gerard Weis, vice-president of data communications and software services at Sears. "IBM and NET worked with us in 1986 to facilitate our connection of the NET multiplexers with IBM's network manage-

Continued on page 45

Gateway opens up to Novell

BY PATRICIA KEEFE
CW STAFF

IRVINE, Calif. — In an effort to widen its market, Gateway Communications, Inc. recently backed off from its proprietary network foundation and opened up its gateway and bridge products to support Novell, Inc. Advanced Netware-based networks.

Gateway's G/Net network utilizes a customized version of Netware and supports a set of protocols used by the core Netware product. G/Net users will now be able to communicate with versions of Netware customized for an estimated 37 local-area networks, as well as gain access to more than 4,000 Netware-compatible multiuser applications, the company said.

Gateway further buttressed its personal computer network family by announcing modular products designed to provide wide-area networking and net-

Continued on page 42

Inside

BIT BLAST

Network Software migrates packages to PS/2

Network Software Associates, Inc. in Laguna Hills, Calif., recently migrated all nine of its software packages to IBM's Personal System/2, reportedly allowing IBM Personal Computers to communicate with one another and with IBM hosts via IBM's Systems Network Architecture software. The company claims to offer the first PS/2-to-PS/2 link based on Synchronous Data Link Control and the first LU6.2 and RJE packages for PS/2s attached to an IBM 3274 or 3174 controller. The packages were designed to run on a variety of modem and terminal emulation boards.

Micom Systems, Inc.'s Interlan division has signed an OEM agreement to use **Network General Corp.**'s Sniffer Protocol Analyzer. The Sniffer reportedly pinpoints network bottlenecks by monitoring packets as they travel over the network. Under the terms of the agreement, **Micom-Interlan, Inc.** will remarket Sniffer as part of its Ethernet local-area network (LAN) product line under the name LAN Detector.

Data Switch Corp. in Shelton, Conn., has joined the throng of companies supporting IBM's Netview network management system. The company recently announced plans to link its communications switching and control products up with IBM's Netview, via the firm's Netview/PC interface. The first product with Netview/PC support will be available by this fall, Data Switch said.

About a third of the companies that have gotten beyond the starter-kit stage with Manufacturing Automation Protocol (MAP) are slowing down their MAP plans, according to **Advanced Manufacturing Research.** The Salem, Mass., company surveyed approximately 30 firms that have MAP networks with more than two or three nodes and found that 35% of these installations were taking longer than expected. Companies behind schedule cited late vendor shipments as the cause of delay in 55% of the cases; waiting for MAP Version 3.0 in 30%; and other reasons, such as lack of conformance testing and internal implementation problems, in 15% of the cases.

Network Research Corp. has added a Netbios interface to its Fusion Network Software, permitting applications written for the IBM PC Network program to run across a Transmission Control Protocol/Internet Protocol network. The option is scheduled to be available during the fourth quarter.

Gateway

CONTINUED FROM PAGE 41

work performance capabilities. Gateway unveiled three products — its first Ethernet offering, the G/Ethernet adapter card, a board-level network server and a data base server.

Gateway has introduced Netware-compatible versions of its IBM Systems Network Architecture, asynchronous and CCITT X.25 gateways and bridge wide-area links. The products are said to create session-transport protocols in a Netware environment to allow shared network access to communications facilities.

The IEEE 802.3-compatible G/Ethernet is cost-competitive at $395 and features 32K-byte random-access memory (RAM). "The effect of the increased memory will provide our G/Ethernet customers with a significant increase in network capacity under heavy work loads," said Walter Schramm, Gateway's vice-president of sales and marketing.

The initial release supports Netware on the file server side, as well as Transmission Control Protocol/Internet Protocol. The networking devices will work with RG-59, IBM 3279-style and conventional Ethernet coaxial cables.

Both the G/Server Engine, said to be the first high-speed file server on a card, and the G/Database Engine, which enhances data bases' performance, feature an on-board Intel Corp. 80196 coprocessor with 1M byte of RAM, 64K-byte buffer memory and dynamic bad-sector remapping. Each engine supports up to two 140M-byte disks, or 280M bytes per engine. Users have the option of configuring the engines to support disk mirroring, which provides continuous disk backup. The engines operate independently of the host PC, allowing the PC to run its own applications.

The server and data base engines each cost $2,150 and are slated to ship next month, Gateway said.

LAN vendors

CONTINUED FROM PAGE 41

ly, LANs seldom provided all the features users really needed or wanted.

So, with competition heating up in the corporate networking market and expertise at a premium in key areas like IBM's Systems Network Architecture (SNA) and telecommunications, a growing number of network vendors are taking the merger or strategic alliance route as a way to acquire key networking products without having to develop them from scratch.

In the last six months, more than a dozen communications companies have struck deals designed to extend and augment their product lines. The most recent is the proposed merger between Bridge Communications, Inc., a terminal-to-host vendor, and oft-engaged but never wed 3Com Corp., a leading LAN vendor.

Other recent linkups of note include Novell, Inc.'a purchase of both micro-to-mainframe vendor CXI, Inc. and LAN software developer Softcraft, Inc.; Excelan, Inc.'s acquisition of Kinetics, Inc.; and the purchase of Centram Systems West, Inc. by Sun Microsystems, Inc. Even IBM has chosen to buy — rather than develop — technology, signing a joint development and marketing agreement with T1 supplier Network Equipment Technologies Corp. in June.

Crucial to success

Partnerships have become crucial to success in the communications marketplace. Users now realize that no one company — not even IBM — can supply all the communications products and links required to create a large corporatewide network. To be competitive, users need, and vendors should supply, the following key connections:

- LANs: This capability should range from small department-size LANs to utility LANs capable of linking departmental LANs into a large companywide backbone network.
- SNA: With more than 25,000 SNA networks in Fortune 2,000 corporations, the ability to supply an SNA gateway between disparate networks and processors is necessary. Agreements such as Tandem Computers, Inc. 'a minority stake in Netlink and Altos Computer Systems' purchase of Communications Solutions, Inc. late last year are attempts to address this niche.
- Major vendor compatibility: At a minimum, communications vendors will be required to support products from IBM, Digital Equipment Corp. and Apple Computer, Inc. Northern Telecom, Inc. is a leader in this area, having signed deals with Apple, DEC and Banyan Systems, Inc. for wide-area networking products.
- Telecommunications support: Corporate short-term requirements call for supporting packet data switching and T1 connections. Long-term support will encompass support for Integrated Services Digital Network.

Given the current communications climate in most major corporations, it has become increasingly clear that while having a viable LAN is still good, sold alone, it is just not good enough.

Fleig is director of systems research specializing in local-area networking and IBM communications for International Technology Group in Los Altos, Calif.

IEEE builds new Ethernet standard

Group envisions 10M bit/sec. version of twisted-pair wiring protocol

BY ELISABETH HORWITT
CW STAFF

PALO ALTO, Calif. — As rival vendors race to develop a 10M bit/sec. Ethernet that runs over twisted-pair wiring [CW, Aug. 3], a study group formed by members of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) 802.3 standards committee is taking the first step toward standardizing the protocols for such offerings.

The group, which consists of more than a dozen vendors, was formed during the July meeting of the IEEE 802.3 standards committee.

The new group's purpose is to look into the possibility of a 10M bit/sec. version of the IEEE 802.3 twisted-pair Ethernet standard, sometimes called Starlan.

The group, which will have its first meeting next week, includes representatives from Hewlett-Packard Co., AT&T, Retix Co., Texas Instruments, Inc., Ungermann-Bass, Inc., Unisys Corp., Xerox Corp., Digital Equipment Corp., National Semiconductor Corp., Intel Corp. and Honeywell Bull, Inc.

The study group will entertain proposals from members, several of which are said to be already working on 10M bit/sec. Starlan implementations of their own.

HP technology ready

HP, for example, has developed the technology for implementing 10M bit/sec. Ethernet on unshielded twisted-pair wiring that is bundled with other telephone wiring, according to Willem Roelandts, general manager of the company's Information Networks Group.

HP's implementation is plug compatible with the 1M bit/sec. Starlan standard and supports the same distances between workstation and wiring closet, so that users can install either the 1M or the 10M bit/sec. network in a given installation, Roelandts said.

The importance of a 10M bit/sec. Starlan, Roelandts said, is that it allows businesses to use existing building wiring schemes to support high-speed networking, which will become an important consideration for users of the new Intel Corp. 80386-based generation of microcomputers.

HP hopes to win industry acceptance for its 10M bit/sec. Starlan specifications as part of the standard before making a formal product introduction, Roelandts said.

Needs support

The question remains, however, as to whether HP can win over vendors like 3Com Corp. and AT&T, which are also said to be working on 10M bit/sec. twisted-pair networks.

HP and 3Com are currently discussing how their respective offerings might fit together, according to Roelandts.

Although 3Com did not attend the July IEEE 802.3 standards committee meeting, the company does plan to send representatives to the study group's meeting this month, according to Andrew Verhalen, 3Com's director of marketing for hardware.

"We're very interested in helping establish a 10M bit/sec. twisted-pair wiring standard, and we hope that our own product will be compatible," he added.

Sears

FROM PAGE 41

ment software."

Outside observers say there is, indeed, a special relationship between IBM and Sears, which is virtually an all-IBM shop. "The Sears integration of NET and Netview was done under an agreement with IBM's Federal Systems Division in Maryland," notes Francis Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. "It's common knowledge in the industry that Sears has a commitment to IBM and that IBM has a commitment to them. IBM has also used Sears as a test site for various products in the past."

The network is Sears' attempt to put in place a backbone network that could serve all the business groups within the corporation. The single, integrated SNA network supports the communications needs of Sears' merchandising group, its Allstate Insurance Co., Dean Witter Reynolds, Inc. brokerage business and Coldwell Banker Real Estate Group, Inc.

Together, the combined Sears businesses generate about $45 billion annually, of which $27 billion comes from Sears' retail store operations. The same communications network also routes transactions from 15 million users of the Discover card, a subsidiary operation within Dean Witter, to two DP centers for processing.

Competitive edge

But while it serves a strategic purpose, Sears is willing to talk about this internal SNA network. That is unlike other IBM-only operations like United Airlines, which has repeatedly rebuffed inquiries into the details of its Apollo Computer, Inc.-related network architecture.

United, like Ford Motor Co., is using its technology to gain greater market share in a highly competitive market. Sears is also competing for market share, but the merchandising of its goods plays a strong role in its overall competitiveness, says Walter Loeb, a senior analyst with the New York investment firm of Morgan Stanley Group, Inc.

"I think Sears has a sophistication in technology that few people in their industry recognize," Loeb says, "But it doesn't necessarily reflect in their bottom line because the merchandising aspects are so important."

Business practices and technology are, however, inextricably tied together. Sears' new chairman, Michael Bozic, is trying to modernize Sears' aging distribution system, which reportedly costs Sears 8% of sales. Competitors K-Mart Corp. and Wal-Mart Stores, Inc. average only 3% of sales for distribution costs, and both of them have chosen a different communications technology — very small-aperture terminal — for internal communications.

SNA was chosen by Sears because it was the common denominator for most of the company's divisions in the late 1970s and early 1980s. SNA is credited with allowing Sears to create a wide-area network that prevents a high volume of local traffic from interfering with traffic routed to host computers.

"We are very satisfied with SNA," Weis adds. "It allows any terminal in the network to connect with any mainframe, regardless of location. To support an additional computer anywhere in the country, all we do is change a software table at our network control center." The network does not have to be turned off to add new components, he says.

The SNA-only design also eliminates the need for statistical multiplexing, Weis says. Instead, a hierarchical top-down system was put into place with low-end IBM 3720s filtering local traffic up to front-end IBM 3725s and IBM host computers.

"All the polling is contained within a locality," Weis says, "so that none of the interlocal access and transport area circuits are congested with that traffic. The IBM 3720s only send valid data upstream." The only multiplexing of any consequence occurs in the 50 T1 intercity lines, which combine voice and data messages.

'Essential product'

IBM's Information Management software package is another important element of network management.

"Information Management provides problem-and-change management," Weis says, "When you try to keep track of as many things as we do, it's an essential product to maintain operations." The dozen or so staffers per shift at Sears' network control center in Chicago use Information Management to help resolve network faults before they escalate into a crisis.

In size, the Sears network is third only to IBM's internal SNA networks, Weis says. Those two IBM networks are the IBM Information Network in Tampa, Fla., and another network that serves internal IBM operations. Sears' network has grown by nearly 30% in each of the last two years, reflecting an increase in the number of connections to cluster-controllers from 5,384 to 8,980 between 1985 and the end of this year.

Netview is critical to the smooth operation of a vast nationwide network, Sears managers say. "I don't think you could build a network of this size without Netview," says Weis, who oversees the integrated network that his organization designed four years ago.

Before then, Sears' divisions had been using more than 10 separate SNA networks to support their separate business functions.

Creating a single voice/data network in 1984 gave Sears several leverage points, Weis says. Among them were central control of the network utility, the ability to buy network components in volume at discounted prices and improved vendor management with suppliers such as IBM, the regional Bell holding companies and U.S. Sprint Communications Co., the principal interstate carrier for the wide-area network.

In addition, Sears is converting most of its AT&T leased lines to others provided by the regional Bell operating companies. Sears says the reason for doing this is that the holding companies are providing shorter delivery times for new installations. Sears uses voice lines to send analog data from thousands of modems and has no plans to substitute digital signals from the scattered modems.

IBM's Netview is at the heart of this unified Sears system. Netview supports central management of the far-flung network by creating a single list of all system alerts and providing real-time monitoring.

"Systems management functions have now been folded into Netview, giving it the ability to handle automated responses to network alerts and providing centralized automated control," Weis says.

The NET multiplexers are also capable of automatically rerouting traffic around a damaged portion of the network. As yet, there are no IBM 9370s in the field, but Weis says Sears was evaluating two units. "We will use the 9370s as remote network servers," Weis says, "and that will allow in-house printing to be done at distributed sites, close to the end users."

The engine driving the network is a single IBM 3090 Model 200 with 256M bytes of expanded memory. Tucked away in a northwestern Chicago suburb, the 3090 mainframe has been dedicated to running the Sears network. Adjacent to the computer room that houses the network's central mainframe is a Network Control Center that monitors all system alerts and issues all system commands to repair network faults.

A mirror-image site in Dallas is also in place, prepared to take over command of the network in the event a tornado, power failure or other catastrophe hits the Chicago center. The Dallas center is manned but has no telecommunications staff. An IBM 3090 Model 200, just like the one in Chicago, sits idle, waiting to be placed on-line in an emergency.

The Dallas mainframe is tested every week, and Chicago personnel visit from time to time to practice network-control functions at the Dallas site. Although both the Chicago and Dallas network centers have diesel generators, the ones in Dallas could run indefinitely if the Chicago center ever became severely damaged.

Since the communications network is so large, it is considered a resource to all divisions within Sears. An advisory board made up of DP managers and senior managers from each Sears business group meets regularly to discuss network planning and management with Weis and his Chicago staff.

Sears recently decided that its network and networking expertise is extensive enough to support a profitable business as a value-added reseller.

The company created a wholly owned subsidiary, Sears Communications Co., to sell communications services to end users who did not have private networks of their own.

"We feel that we can leverage this new business off the experience we've gained in designing, implementing and operating a very large SNA network," says Weis, who also acts as president of the new venture.

The company, which has fewer than 20 major accounts right now, is expected to be a profit area for Sears, says Larry Jellen, vice-president of marketing and sales for Sears Communications. "We're selling an end-to-end service for companies with at least 20 to 30 remote locations," Jellen says, "and we're guaranteeing the amount of network availability and response time by contract. Users don't have to pay for downtime."

The Sears Communications end-user service does not reflect excess capacity within the Sears network, Weis says. And Sears will not run a user's applications — users must supply their own host computers to do the processing.

The selling point is Sears' experience with SNA and with IBM communications architecture, something Sears feels has been proven by IBM's recent product announcements and statements of direction. They are, in fact, statements about Sears' own direction in SNA design.

Sears communications network

Network Equipment Technology switches coordinate voice, SNA connections among multiple U.S. sites

INFORMATION PROVIDED BY SEARS, ROEBUCK AND CO.
CW CHART

SEARS' NETWORK has grwn by nearly 30% in each of the last two years, reflecting an increase in the number of connections to cluster controllers from 5,384 to 8,980 between 1985 and the end of this year.

Banks

FROM PAGE 41

based on a survey of chief financial officers, DP managers and EDI coordinators within Fortune 1,000 corporations as well as in-depth interviews with executives at corporations using EDI. Electronic Cash Management, Inc., a Marietta, Ga., consulting firm, and the Bank Administration Institute, a research institute in Rolling Meadows, Ill., are assisting with the research.

Study sponsors include Bank of Boston Corp., Bankers Trust Co., The Chase Manhattan Bank NA, Chemical Bank, Continental Illinois National Bank & Trust Co. of Chicago, First Interstate Bank, Ltd., First National Bank of Maryland, Irving Trust Co., Manufacturers Hanover Trust Co., PNC Financial Corp., Security Pacific Corp. and Shawmut Corp.

> "BANKS HAVE discussed . . . the possibility that a bank might serve as a local value-added network."
>
> JACK SHAW
> ELECTRONIC CASH MANAGEMENT, INC.

Cashing in

The banks are eager to capitalize on their previous investments in communications links with major corporate customers for electronic payment and cash management services, Manion said. "Banks have established 'electronic shelf space' in so many companies already, it makes sense for them to offer products that allow companies to communicate with other companies using bank networks," he added.

Manion said the banks could either handle all of the financial and network services themselves — and in doing so, compete against existing EDI network vendors such as GE Information Services in Rockville, Md., and McDonnell Douglas Electronic Data Interchange Systems Co. in St. Louis — or form alliances with those value-added network vendors.

Thomas Tucker, the Bank Administration Institute's director of operations and technology, said the first EDI service that banks are likely to offer is the transmission of detailed remittance data to go along with intercorporate payments.

An EDI pilot project involving General Motors Corp. and eight banks is already proving the feasibility of having the auto maker send payments and remittance data to its suppliers, with the banks as intermediaries, Tucker said.

However, the banks are not fearlessly rushing into the EDI industry, according to Victor Wheatman, an analyst with Input, a research firm in Mountain View, Calif.

Some banks are reluctant to go beyond the familiar service of handling electronic payments, either because EDI is not part of their strategic business plan, or because they fear security problems or new liabilities if incorrect data is sent with a payment, he said.

In the short term, banks will want to make their existing electronic payment and cash management services compatible with the EDI standard X.12 and then move on to intercorporate transactions, according to Jack Shaw, president of Electronic Cash Management.

"One idea that a number of banks have discussed is the possibility that a bank might serve as a local value-added network or perhaps as a port to the big, national value-added networks," Shaw said.

NEW PRODUCTS

Local-area network hardware

A multirate data service unit/channel service unit (DSU/CSU) for digital data service networks has been announced by **Universal Data Systems.**

The **Model DDS/MR** is said to operate at 56K, 9.6K, 4.8K or 2.4K bit/sec. over the network in point-to-point and multipoint applications. It combines the functions of a DSU and a CSU into a single unit directly compatible with Bell 500 Series equipment.

The unit costs $695.

Universal Data Systems, 5000 Bradford Drive, Huntsville, Ala. 35805.

Customer-premise equipment

A **Multiplexer Interface Panel** and a **Data Distributor** designed for use with **Micom Systems, Inc.'s** Instanet6000 Series 40 Data private automatic branch exchange has been announced by Micom.

The Multiplexer Interface Panel is an interface backplane that provides five scan shelves of 128 channels each.

The Data Distributor Model M64321 is a single plug-in module that provides 32 channels multiplexed over twisted-pair wires to a connector panel.

The Multiplexer Interface Panel costs $3,500. The Data Distributor costs $2,250 for the data-only version and $3,250 for the modem-control version.

Micom Systems, 4100 Los Angeles Ave., Simi Valley, Calif. 93063.

Links

A communications program said to allow a microcomputer to emulate the AT&T 5425/4425 buffered display terminal has been introduced by **Telexpress, Inc.**

The software, called **EM4425**, provides support for the AT&T 5425/4425 modes of operation, such as set-up screens compatible with the terminal; scroll mode that supports a memory-access screen of 78 rows by 80-col. support for up to four simultaneous windows; and support for 26- and 27-line keyboard labels.

EM4425 costs $150 per license.

Telexpress, P.O. Box 217, Willingboro, N.J. 08046.

File servers

Solana Electronics has introduced a communications server said to enable remote Apple Computer, Inc. Macintosh users to access that company's Appletalk network and its resources directly from dial-up telephone lines.

R-Server with a modem connects as the data path into a local Appletalk network to manage data traffic between the remote Macintosh with a modem and any resource on the network.

R-Server costs $495.

Solana Electronics, Suite A, 7887 Dunbrook Road, San Diego, Calif. 92126.

Cabling

A four-pair shielded plenum transceiver cable that meets IEEE 802.3 requirements for compatible local-area networks has been introduced by **Belden Wire and Cable.**

The **Belden 89901** pair shields are electrically isolated from the outer shielding with an overall polyester isolation tape and Duofoil shield.

The Belden 89901 costs $1,782 per 1,000 ft.

Belden, P.O. Box 1980, Richmond, Ind. 47375.

A manufac system shou make things Like prof

And deadlines.
And decisions.

For years, mid-sized manufacturers have needed a practical, comprehensive management system. One that would give them a few of the advantages their larger competitors take for granted.

Honeywell Bull has one. We call it the HMS/7 manufacturing management system. You'll call it the edge.

Because whether you have a computer department or not, HMS/7 will let you automate with a single database. From shop floor functions all the way to top management. Getting you to market fast while ensuring quality every step of the way.

HMS/7 includes workhorse DPS 7000 hardware and

Customers are more imp

turing
ld help you
.
its.

software. As well as field-proven MRP II applications software to give you minute-by-minute control of your manufacturing operations.

Honeywell Bull has been helping the world's largest manufacturers for a long time. With HMS/7, we're bringing everything we've learned to mid-sized companies. Complete with education, training, service, and support.

For more information call 1-800-328-5111, ext. 9705, or write: Honeywell Bull Inc., Plant Manufacturing Systems, MS440, 200 Smith Street, Waltham, MA 02154.

Honeywell Bull

ortant than computers.

How to survive your S/3X without Decision Data.

So nobody knows who purchased the problem.

Alright. You might be able to survive without us. But why make things tougher than they need to be?

With over 17,000 satisfied customers in many different industries, we're the largest, independent, worldwide supplier of compatible peripherals for the System/36, /38 *and* /34. But our experience with–and commitment to–the S/3X marketplace extends well beyond individual products to total systems solutions and support.

When you work with us, you work with a Decision Data representative who knows our products inside out; who takes a personal interest in your business and your needs; and who specializes in giving you more for less.

You get direct support from our own Decision Data Service, Inc. with 120 locations and over 500 field engineers ready to help when you need them.

You get products backed by an annual R&D investment of nearly $9,000,000 to ensure complete compatibility and outstanding price/performance features; products that are proven reliable by countless, rigorous testing procedures.

And you get the kind of product selection that results in the most successful solutions. Our product family includes everything from matrix, band and laser printers to multi-user systems, ergonomically designed terminals and personal workstation systems for decision support applications. Even memory enhancements and uninterruptible power supplies.

You [illegible] have worried.

All of which means when your solution includes Decision Data, you can feel very comfortable knowing you'll never have to mask your decision. Ever.

For more information, simply call 1-800-523-6529, or in PA, (215) 757-3322. In Canada, call (416) 273-7161.

In case your supplier does not supply servic

Decision Data Computer Corporation

A **Decision Industries** Company

COMPATIBLES ENGINEERED TO SURVIVE THE FUTURE.

HARD TALK

James Connolly

Supermini battle rages

Most discussions of what people call "the mid-range" focus on the computer market served by systems such as the IBM System/36 and 9370 and Digital Equipment Corp.'s VAX 8250. That is a performance range in which IBM and its minicomputer rivals are knocking heads.

But there is another, sometimes forgotten, group of mid-range systems that have been the subjects of heated marketing battles lately. Those are the systems in the high-end super-minicomputer and small mainframe class, such as IBM's 4381 and 3090 Model 120E, DEC's VAX 8700, Prime Computer, Inc.'s 6350 and Hewlett-Packard Co.'s HP 3000 Series 930.

As with the smaller systems, the activity in the upper mid-range has generally involved product introductions, enhancements and repricing.

In May, IBM introduced four models of the 4381, featuring twice the memory and 30% performance gains in comparison with older 4381s. The simultaneous introduction of the 4381s and the 3090 Model 120E represented not only moves against IBM's competitors, but, in effect, competition among IBM's own products as the performance of the 4381 and 3090 overlapped for the first time.

Continued on page 52

DEC preps faster Microvax

Q-bus-based mini seen out-gunning low end; September intro eyed

BY DAVID BRIGHT
CW STAFF

Digital Equipment Corp. is ready to introduce a Microvax that outperforms some larger and more expensive VAX 8000 series systems and is based on DEC's Q-bus rather than the faster VAXBI bus.

The Microvax III is expected to debut at the Decworld exposition to be held in Boston from Sept. 8-18.

According to a beta-test user and a third-party developer, the new Microvax will perform more than 2 million instructions per second (MIPS) and will surpass the performance levels of machines like the VAX 8250.

However, because the two lines use different buses, Microvax users will still be unable to upgrade to the VAX 8000 series.

In addition to the Microvax III, observers said they expect DEC to introduce a more powerful Vaxstation, an improved gateway to IBM's Systems Network Architecture (SNA) and possibly a 3-MIPS VAX 8400 to fill a performance gap in the VAX 8000 line.

The Microvax III is intended to leapfrog the performance of competing departmental systems, such as Prime Computer, Inc.'s recently announced 1.6-MIPS 2455. The Vaxstation, which is based on the Microvax series, will compete in the hotly contested technical-workstation market against machines from Sun Microsystems, Inc. and Apollo Computer, Inc.

Priced in the same range as the Microvax II, the Microvax III uses a CMOS microprocessor to more than double perfor-

Continued on page 52

Cards jog 4381 memory

SAN JOSE, Calif. — Locom Corp. recently introduced memory cards designed for use in the third-generation 4381 models that IBM announced in May.

The 2M- and 4M-byte LCM-400 cards use 1M-bit memory technology and were designed to function in the IBM 4381 Models 21 and 24, which are due for shipment in early 1988, or in the seven older 4381 models.

Locom officials said the memory cards, which are available now, are needed because the new 4381s do not support the company's existing 16M-byte modules.

The company also claimed that the cards are, electronically, pin-for-pin identical to IBM cards but are faster and dissipate 25% less heat than the IBM products.

Speed edge claimed

A company spokesman said the Locom card is typically more than twice as fast as an IBM card during a write cycle. He said the LCM-400 cards are mechanically identical in dimension to the IBM cards and that they use edge-card connectors that are compatible with IBM card-cage connectors.

When a 4M-byte card is installed in an older 4381 model, the card functions as two 2M-byte cards.

Locom said 8M bytes of memory cost $20,000, 16M bytes cost $30,000, 24M bytes cost $45,000 and 32M bytes cost $55,000.

Data View

VAX/Microvax markets

Percent of dedicated sites using Digital Equipment Corp. systems in U.S.

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

NCR services System/36s

Says banks, retailers to form bulk of market

BY STANLEY GIBSON
CW STAFF

DAYTON, Ohio — NCR Corp.'s Third-Party Services recently announced that it will provide maintenance for two models in IBM's System/36 line.

NCR said it will service the Model 5360 and Model 5362 as well as peripherals throughout the U.S.

"Banks, in particular, often have NCR sorters with System/36 processors. It's a natural fit that way," said Jeff Sugheir, NCR's Third-Party Services manager of marketing services.

Other users likely to have both NCR and IBM equipment are retail stores that have NCR point-of-sale equipment and a System/36. However, NCR does not require an IBM user to have NCR gear in order to obtain

Continued on page 56

McDonnell Douglas adds minis

IRVINE, Calif. — McDonnell Douglas Computer Systems Co. recently expanded its line of relational data base minicomputers with six systems featuring greater main memory and disk storage capacities than those of earlier models.

Like the older models, the new systems run McDonnell Douglas's Reality relational data base management operating system, which is based on Pick Systems' Pick operating system.

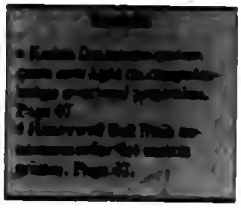
The company replaced its four 3-year-old Series 9200 systems with five models that it said feature up to four times the disk capacity as well as more memory capacity and user ports at the low end.

The new low-end 9225 supports 2M to 4M bytes of memory, up to 780M bytes of disk storage and up to 96 users, compared with 1M to 2M bytes of memory, 520M bytes of disk storage and a maximum of 64 users on the older 9220.

At the high end now is the 9265, with a disk capacity of 4.16G bytes. Like the earlier 9250, which had a disk capacity of 1.04G bytes, the 9265 supports up to 8M bytes of memory and 208 users.

The company also added high-end models to the 2-year-

Continued on page 56



Utility's MIS weathers climate shift

BY JAMES CONNOLLY
CW STAFF

PROFILE

SAN FRANCISCO — For two decades, Pacific Gas & Electric Co. (PG&E) has been a company to watch in terms of computer use.

PG&E was on the leading edge in the 1960s, when it established an information systems project and began bringing its commercial data processing and technical computing resources under a common management. The utility, which serves Northern California's energy needs, became an early user of IBM plug-compatible mainframes made by Amdahl Corp. and National Advanced Systems Corp. (NAS) in the 1970s. During the 1980s, PG&E has standardized on the IBM Personal Computer and was among the first firms to negotiate site licenses for PC software.

Now, with IBM and IBM-compatible standards at the mainframe and workstation level, PG&E officials are looking at their options for the middle level in a three-tiered computer hierarchy, as the MIS group and the corporation adapt to major changes in the utility industry. It is s search that may prove futile, at least in the near term, according to A. W. Simila, manager of PG&E's information systems department.

A. W. Simila

"Currently, the technology is very strong at the mainframe level and at the desk top. We're just beginning to get that middle tier defined," Simila says, adding that it is difficult to specify PG&E's middle-tier needs. "We don't have that fully rationalized because we are still waiting for the industry to settle down."

PG&E is evaluating the offerings of various hardware vendors, including the IBM 9370 and Digital Equipment Corp. VAX minicomputers, and has used local-area networks in the middle tier for specific applications. "But the major thrust is still at linking workstations directly to the mainframe," reports Simila, an industrial engineer who has been involved with computers in utilities for 20 years.

Continued on page 56

Supermini

CONTINUED FROM PAGE 51

In April, Prime positioned its 9350 and 9550 against the lower part of the 3090 line. Meanwhile, DEC has continued its well-documented drive of its VAX line from the middle of the IBM 4300 performance range into the 3090 scale, HP is preparing to ship its first production versions of the HP 3000 Model 930 reduced instruction set computer and National Advanced Systems Corp. has brought its AS/VL systems to the U.S. market.

It is obvious that these vendors and others are accelerating their efforts in the mid-range. As usual, users benefit from such competition if only because of the price pressure created, particularly when a user leverages the threat of changing vendors.

Dealers pushing harder

But there also is an accelerated competition on the part of another group — the lessor and used computer community. Those dealers appear to be pushing harder now than they have for about a year when it comes to promoting used IBM 3080s and 4300s over new 4300s and 3090s.

The most recent example was that of Computer Merchants, Inc. promoting used IBM 3083s and 4381s as alternatives to the newer 4381 Models 21 to 24 and the 3090 Model 120E.

Computer Merchants bluntly calls the 3090 Model 120E a "typical entry-level trap" designed to draw customers into the 3090 family. Jumping for the low-end 3090, with a bare-bones price of less than $1 million, may make sense for the user who sees the potential for a relatively short-term need for features such as expanded storage — available only on a 3090 — or 4.5M bit/sec. channels, available on the 3090 when IBM gets around to announcing it.

Some don't need leading edge

But dealers like Computer Merchants and its competitors, including Comdisco, Inc., have a valid point if they argue that many people may not want those leading-edge functions.

Computer Merchants makes a case that is hard to dispute. The dealer says a user who needs a mainframe in the range of 7 to 8 million instructions per second (MIPS) can get a used IBM 3083 Model J for $425,000, compared with the $900,000 or more for a 7.5 MIPS 3090 Model 120E or 8.1 MIPS 4381 Model 24. The dealer makes similar arguments for used 4381s over the new 4381 models.

Such used machines may not be for everyone. However, their presence in the market serves a purpose. Like the threat of jumping to other vendors, the option of buying a used computer does its part in keeping new system prices in check.

Connolly is *Computerworld's* senior editor, systems & peripherals.

Faster Microvax

CONTINUED FROM PAGE 51

mance to at least 2 MIPS. That compares favorably with the VAX 8250's estimated capability of about 1.3 MIPS, but the Microvax III retains the Q-bus used in the Microvax II. The VAX 8250 uses DEC's VAXBI bus. The CMOS microprocessor includes a subset of the VAX's CPU instruction set.

A third-party hardware developer who said he has seen the new system said the chip can ultimately operate at 3 MIPS, but that DEC cannot yet produce the faster versions in quantity.

According to the source, the only incompatibilities between the Microvax II and the Microvax III are that a new memory interconnect scheme is used. "If you had a Microvax II on your floor right now, and you wanted to make it a Microvax III, you'd not only need a new CPU, but also new memory boards," he said. "I believe the memory boards that will run on a Microvax III are identical to those memory boards that are now being used in the MicroPDP-11/83." He said he was told that DEC will offer upgrade kits for moving up to a Microvax III.

Early user makes plans

One Microvax III beta-test user said he is pleased with the system and claimed it runs faster than 2 MIPS. Since the VAX 8000 systems offer higher I/O speeds than the Microvax III, he said he does not expect the new systems to replace VAX 8000 machines. Instead, he said his organization plans to cluster the higher-end machines as file servers.

John McCarthy, research manager at Forrester Research, Inc., said the Microvax III will run at 2.5 MIPS. He said the VAX 8400, which is generally believed to use a Microvax III-related chip set on the VAXBI bus, is also definite.

Microvax II prices, including a DEC VMS license, currently start at $18,400, while the base price of a VAX 8250 with a VMS license is $92,000.

Analyst Myron Kerstetter of the Gartner Group, Inc. in Stamford, Conn., said he expects the new system to carry the same price as the Microvax II. In addition, Kerstetter said DEC should use Decworld to introduce an aggressively priced Vaxstation based on the new chip.

He added that DEC will introduce a more powerful gateway linking DEC systems to SNA, but the software may not be available until much later. The gateway's PDP-11 will be replaced by a VAX, he said.

Recent PC announcements have left Compaq in an enviable position.

Compaq still

In the midst of the clamor surrounding the new IBM® PS/2 series of personal computers, one thing is perfectly clear to people who really know PC's. COMPAQ® personal computers still work better. They're faster, more compatible, more expandable, and more flexible to accommodate the advancements so many users demand.

Consider flexibility. Compaq offers 5¼" diskette drives, and allows you to add 3½" drives if you want them. In fact, you can add up to four different storage devices on all COMPAQ desktop computers.

Demand for the 12-MHz COMPAQ DESKPRO 286 has nearly doubled since the PS/2 introduction.

The 12-MHz COMPAQ PORTABLE III is the smallest, most powerful full-function portable there is.

And what users demand are advancements that enhance their productivity *within* the industry standard.

Advancements that extract more performance from over 10,000 different business software programs—the largest library of productivity software in the world.

Still the performance leader

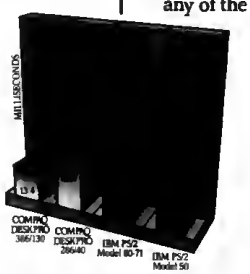
COMPAQ personal computers prove superior in overall performance.

Take speed. The COMPAQ DESKPRO 286® runs your software up to 20% faster than its PS/2™ counterpart. It also has high-performance fixed disk drives that are up to 2½ times faster than theirs, with access times averaging less than 30 milliseconds. What's more, the COMPAQ DESKPRO 386™ sets all the records for speed in advanced-technology, industry-standard personal computers.

Examine compatibility. We let you use all the industry-standard software and expansion boards that you already own.

Look at expandability. Because our slots follow the industry standard, you have almost unlimited options to add the functions you need. Extra memory, networking, communications, and many others. So you can configure your system exactly the way you want it.

Finally, compare portability. You can't. The 12-MHz 80286-based COMPAQ PORTABLE III™ is the undisputed leader. It offers all the functions and performance you'd expect to find in the most advanced desktops. Without any of the compromises you'll find in other portables.



COMPAQ fixed disk drives can access data up to 2½ times faster than PS/2 drives

Enhancing, not inhibiting

Each component in every computer we build is designed to be the best, both individually and as part of the overall system. This way enhancements work together to give you unparalleled performance. Faster RAM. Internal backup systems. Expanded memory and disk caching systems. Faster processors and coprocessors. Faster fixed disk

It still simply works better.

works better.

The COMPAQ DESKPRO 386 sets the standard for high-performance, advanced-technology desktop computing.

drives that store more. These are all innovations built into both desktop and full-function portable PC's.

Innovations made *without* sacrificing industry-standard compatibility.

Earn higher returns on your investment

The industry standard has a lot going for it. Namely, you and over 10 million other PC users it represents. American business has $80 billion invested in the current PC standard, including 40 million software packages, 32 million peripheral products, and hundreds of millions of hours in training.

Compaq designs its computers to protect your investment. And because they do more, they also maximize it.

Two-way compatibility

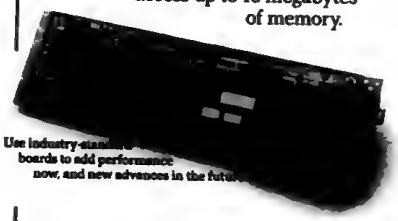
Compaq has become famous for its legendary compatibility and connectivity. Our PC's will run thousands of programs far faster

The new MS OS/2 operating system will run on all 80286- and 80386-based COMPAQ personal computers.

than other computers. All the popular programs, including Lotus® 1-2-3®, dBASE III PLUS®, Microsoft® Word, Symphony®, and Paradox®, to name just a few. Without modification.

Furthermore, you can insert the 5¼" diskettes your COMPAQ computers use into all the other compatible computers in your office, without time-consuming diskette conversions.

But our definition of compatibility looks to the future as well. For example, all 80286- and 80386-powered COMPAQ personal computers will run the new MS OS/2 operating system, allowing you to break the 640-Kbyte memory barrier and directly access up to 16 megabytes of memory.



Use industry-stan… boards to add performance now, and new advances in the futu…

COMPAQ computers will also allow you to run all the applications developed for OS/2™ Again, much faster.

We don't burn bridges, we build them

At Compaq, advances are measured by our ability to push technology forward, without leaving you behind. Building onto an existing body of work is more valuable than starting from scratch. That thinking led Compaq to the Fortune 500 faster than any other company in history.

The PC industry standard has the flexibility to incorporate developing technology. More important, however, Compaq lets you take advantage of the latest technology in a way that's fully compatible with the hardware, software and add-ons you already own. So Compaq protects your investment, building bridges from today to tomorrow.

These are all reasons why recent surveys show COMPAQ owners are the most satisfied personal computer users.

All the more reason to call 1-800-231-0900, operator 39 for information and the location of your nearest Authorized COMPAQ Computer Dealer. In Canada, call 416-449-8741.

COMPAQ®

Utility's MIS

CONTINUED FROM PAGE 51

Reflecting on the technological and business changes of those two decades, Simila says a move into a commodity era in terms of departmental computing and simpler operating systems would make his job easier. "The hardware is giving us as much as we can use. There is still that balance between hardware and software, and it always seems that software is tougher to solve," he says. But rather than becoming easier to use, system software and data management software is becoming more complex and technically oriented, he notes.

The lack of middle-tier products has slowed PG&E's progress toward a goal of networking all knowledge workers' workstations and means the project will take "a little longer" than the target time of five years from now, Simila says.

PG&E projects continued 25% to 30% annual growth in computing power at both the mainframe and the microcomputer level. Those microcomputers, which now number about 8,300 in the 28,000-employee company, are used in both stand-alone and terminal-emulation modes. Simila says he sees the PC's role as one where it complements the mainframe rather than replaces it.

To support the growth of the PC population, PG&E became one of the first corporations to receive site licenses four years ago, when it acquired such a license for Lifetree Software, Inc.'s Volkswriter. Simila says the growth is a result of fundamental changes in the way energy utilities do business in an era of deregulation.

"Banking had to face the market earlier . . . In our industry, MIS is just now emerging more and more from being a backroom support-type function. We are focusing more and more on the outside," Simila says. The company's MIS group is working on strategies to link technological developments to the changes in the business environment.

Customers hungry for more

With deregulation, PG&E's customers are looking for more individualized and varied services. Those changes mean new approaches to sales support and billing as well as accounting.

"Billing becomes more and more complicated all of the time," Simila says, noting that customers want more details in their bills and that public utility commissions require power companies to provide more detail in justifying rate requests.

In conjunction with providing more information to customers and holding onto PG&E's position as the "preferred supplier of energy services," PG&E has used computer technology to get greater production out of more than 3,500 customer service representatives, Simila says.

PG&E also has more than 730 MIS employees supporting data centers in San Francisco and Fairfield, Calif., and at the Diablo Canyon nuclear power facility in San Luis Obispo, Calif.

The data centers house a variety of mainframes, including two IBM 3090s, an Amdahl 5890, several Amdahl 5860s, multiple NAS AS/9080s and AS/9060s and several IBM 4300 series processors. In addition, PG&E uses large disk drives from IBM and three plug-compatible manufacturers.

PG&E was one of the early users of Amdahl equipment and has kept a mix of IBM and plug-compatible manufacturers' systems for more than a decade. Simila reports that the company's size makes PG&E a "cherished account" for the various vendors and eliminates the possibility of a vendor punishing the utility by cutting back on service when another vendor wins a contract.

NCR services

CONTINUED FROM PAGE 51

third-party service, Sugheir said.

Although he declined to name a specific discount rate, Sugheir said NCR is "prepared to discount on an individual basis in relation to IBM's Corporate Service Amendment (CSA)." IBM's CSA, introduced last year, offers discounts from 4% to 33% to customers who manage some of their own maintenance.

NCR also offers a discount program called Partnership Maintenance, under which a customer may receive a service discount for establishing a means to track problems themselves, such as a help desk. But this discount is offered only on NCR equipment, Sugheir said.

NCR Third-Party Services has 6,300 field personnel in 400 locations in the U.S., the vendor said.

McDonnell

CONTINUED FROM PAGE 51

old Series 6000 small-business systems.

The 6460 is the new high-end model in the Tower portion of the 6000 series and features up to 4M bytes of memory, 420M bytes of storage and support for 64 users, compared with 1M byte of memory, 225M bytes of storage and support for only 32 users offered by the earlier 6425.

In the Low Boy portion of the 6000 family, the company added the 6680 with support for 4M bytes of memory, 1.5G bytes of storage and 96 users. The earlier 6655 supported 2M bytes of memory, 486M bytes of disk storage and 64 users.

The 6260 costs $62,500, and the 6680 costs $115,500. Prices for the Series 9200 range from $98,500 for the 9225 to $253,000 for the 9265.

NEW PRODUCTS

Processors

A series of Sun Microsystems, Inc. Sun 3-compatible memories said to occupy one slot have been announced by **Clearpoint, Inc.**

The **SNXRAM** frees up four slots in the Sun 3/160 and 3/180 for VMEbus expansion options. It is available in 16M- and 24M-byte capacities using 1M-bit DIP switch dynamic random-access memories (RAM). The 4M-, 8M- and 12M-byte density SNXRAM models use 256K-byte DIP switch dynamic RAM.

The SNXRAM/24M bytes is priced at $10,000, and 16M- and 12M-byte capacity boards cost $7,825 and $5,500, respectively.

Clearpoint, 99 South St., Hopkinton, Mass. 01748.

Graphics systems

A preconfigured color graphics seismic display station has been introduced by **Raster Technologies, Inc.**

The **Entry Level Model One/80S** offers 1,280- by 1,024-pixel resolution with a 60Hz noninterlaced refresh rate. Seismic features include filled/unfilled variable-area display with selectable fill and overlap, variable density and horizon flattening.

Standard interfaces supported include four RS-232 serial ports and a DR11-W high-speed parallel direct memory access interface. Digital Equipment Corp. VT100 terminal capability, Tektronix, Inc. 4014 emulation, transformation, hidden surface removal and interactive device support are all standard features.

With a 19-in. monitor, the system costs $17,500. With a 16-in. monitor, it costs $15,500.

Raster Technologies, 2 Robbins Road, Westford, Mass. 01886.

Data storage

Two ½-in. reel-to-reel tape drives for both high-performance and mid-range system backups have been announced by **Hewlett-Packard Co.**

The **HP 7980A** is a 6,250 or 1,600 char./in. tape drive designed for systems with disk backup requirements of more than 400M bytes.

The **HP 7979A**, offering 1,600 char./in. only, provides for systems with disk backup requirements between 100M and 500M bytes. Both formats are compatible with ANSI standards to allow data interchange between HP and non-HP formats.

Features include automatic tape loading, seven-character alphanumeric front-panel display and performance of Read and Write operations at 125 in./sec.

The HP 7980A costs $22,400; the HP 7979A costs $13,000.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Terminals

Eastman Kodak Co. has introduced its line of **Kodak Datashow** products for computer-image overhead projection.

The Kodak Datashow system includes the Datashow projection pad, a remote control and Showmaker software. Options include paging, blinking, on-screen pointer, split-screen, random-access and automatically timed, preprogrammed sequence. The Kodak Datashow system costs $1,270.

The Kodak Datashow composite video adapter is a plug-in component that makes the transparency system usable with computers that have composite video signals, such as the Apple Computer, Inc. Apple II family. It costs $159.

The Datashow projection pad is a version of the Datashow system designed for real-time use through a personal computer keyboard. It costs $1,095.

Eastman Kodak, 343 State St., Rochester, N.Y. 14650.

Printers/Plotters

The **4/62** color dot matrix printer has been announced by **Honeywell Bull Italia.**

The 4/62 offers automatic switching from cut sheet to fanfold. It operates at 120 char./sec. in letter-quality mode with a print quality of 60 by 18 dot/char. matrix. Other features include 180 char./sec. print speed in near-letter-quality mode and 250 char./sec. in draft mode. Seven colors are standard and up to six fonts can be used on a page at one time. Print width is up to 15¼ in.

The 4/62 is priced at $2,160.

Honeywell Bull Italia, Suite 800, 120 Howard St., San Francisco, Calif. 94105.

Power supplies

An off-line uninterruptible power system (UPS) that provides the protection of an on-line system has been announced by **Topaz, Inc.**

The **Powermaker UPS** consists of an internal power conditioner, a battery charger, a battery, an inverter, a static transfer switch and a surge-suppression network. It provides 100 db of common-mode noise attenuation. If the power fails, the Powermaker UPS begins supplying AC power to the protected equipment in less than one msec, the vendor said.

Powermaker prices start at $2,500.

Topaz, 9192 Topaz Way, San Diego, Calif. 92123.

How our storage products' technology can boost your systems' productivity. No. 1 in a series.

The "industry standard" footprint. Our footprint.

What's in a direct access storage device's (DASD) footprint? Plenty. For one thing, more efficient utilization of your data center's floor space.

Our DASDs take up as much as 40% less floor space than the "industry standard's." You can replace two of theirs with three of ours.

For another, improved reliability.

Our DASDs' footprints are small because their disk enclosures are small enough to stay cool without drawing air from their environments.

We seal them in clean rooms, so the risk of environmental contamination in your data center is next to nil.

Our DASDs also consume less power, thanks to their small disks, and they're easy to service, so downtime goes down, and availability goes up.

It all adds up to greater productivity.

That's our DASD technology's ultimate value to you. And you can't get it anywhere else.

For specs on our full line, call your local Amdahl representative.

amdahl®
The VALUE Choice

Amdahl Corporation
1250 East Arques Avenue
Sunnyvale, CA 94088-3470

End users drive benefit analysis

They get to nominate a project 'Most Likely to Succeed'

BY HOWARD MILLER

No one would dispute the fact that it costs something to implement a computer-based information system. Nor would anyone argue that a substantial benefit from that investment is expected.

Benefits, however, can range from the quantifiable to the intangible. Further, the risk of attaining these benefits can vary from very low to extremely high. Determining the cost of installing a computer-based information system is relatively easy, but quantifying benefits can be a real stumbling block.

Whereas a cost analysis for a computer-based system develops as the logical outgrowth of a feasibility study, a benefit analysis is something that can only be user-driven. The user best understands the form the benefit will take. However, because the user also understands that there is a risk associated with attaining that benefit, he has a natural hesitancy to express this benefit in terms of dollars.

Step-by-step analysis

This article focuses on a method to facilitate the user-driven benefit analysis. Little will be said about cost analysis; for purposes of this article, it is assumed that cost numbers are readily available.

The following benefit analysis process is a multiple-step procedure based on the theory that a similarity exists among the kinds of benefits derived from a computer-based information system and that similar benefits can be grouped into classes. However, recognizing that there is a risk associated with achieving any benefit or benefit class, a risk-of-attainment factor should be assigned to the benefit classes.

The risk of attainment quantifies the risk associated with achieving the benefit. In this way, one may develop a comfort level for the results of the financial analysis calculations. A comfort level is an objective index indicating how assured the user is that the benefits described are achievable. The benefit analysis process consists of the following five steps:

- Identify the benefit classes.
- Establish risk of attainment.
- Complete benefit analysis forms.
- Summarize the benefits.
- Perform a financial analysis.

The ability — or lack thereof — to quantify a benefit does not always reflect its importance to an organization. For example, a new computer-based information system may be required to provide a service that is already available from the competition. The consequence of not installing the system may be loss of market share or even having to go out of business. Quantifying the benefit of implementing this computer-based information system may be difficult — what would be the cost of the lost market share or the cost of going out of business?

Conversely, installing a system that reduces material and labor costs may be easy to quantify and yet may have little impact on the strategic performance of a company. Therefore, benefits can be grouped in the following categories from highest to lowest according to their impact on the business:

Improved strategic performance. This is the benefit area that is most difficult to quantify and achieve due to the esoteric nature of such things as improved employee morale and better utilization of management talent. Business survival is just as likely to create new dilemmas as they are to resolve existing problems. The opportunity for excellence is there, but it is muted.

Improved management control. This area is one of subjective quantification. After implementation, the benefits of improved management control are measurable and directly attributable to the computer-based information system. Prior to implementation, the benefits can only be estimated.

Improved business resulting from a direct order-taking system is something that can be accurately measured after the system is implemented but not before installation. Examples of improved management control

WILLIAM CONE

Miller is responsible for administrative computing at Boston University. He has held senior-level positions in systems management for more than 20 years.

• Assigning a dollar value to benefits

• Multiyear analysis

• Cost avoidance vs. strategic advantage

include increased business volume and improved resource management.

Improved cost displacement or avoidance. This benefit area is the easiest to quantify and has the greatest likelihood of achieving its stated results. Improved cost displacement or cost avoidance is the elimination of staff and/or materials used directly or indirectly to create a product or service.

What is the risk?

To complete the benefit analysis, each benefit within a benefit class is assigned a risk of attainment (see chart above).

The risk of attainment categories are defined as follows:

Assured: Very high probability that the benefit is achievable (70% to 100% chance).

Likely: Moderate chance that the benefit is achievable (31% to 69% chance).

Maybe: Very low probability that the benefit is achievable (0% to 30% chance). Each benefit is also assigned a comfort index based on the benefit/comfort index table. The comfort index is a weighting factor, with cost displacement or avoidance given the highest weighting while improved strategic performance is given the lowest weighting.

The theory is that cost displacement or avoidance is much easier to achieve than improved strategic performance, and, therefore, improved strategic performance must have a much higher return to offset the inherent risk. However, by its very nature, improved strategic performance typically has a much higher potential return.

Benefit/comfort index table

Having end users rate a project in terms of its risk or likelihood to succeed is not enough; MIS must then superimpose this scale to reflect that cost displacement benefits are easier to achieve than strategic advantages

CW CHART

Benefits on paper

Benefit analysis is the meat of the process. MIS assists the user in identifying each benefit derived from the computer-based system. Each benefit is described, quantified, classified and assigned a risk factor (Assured, Likely, Maybe). Benefits are quantified by year, from one to nine, so it is necessary to establish the time span for the analysis. The benefit analysis form documents the benefits. Note that the organization of this form corresponds to the benefit/comfort index table. The benefit classes run down the vertical axis; risk factors run across the horizontal axis. The bold numbers in the boxes are the comfort indexes. The benefit analysis form is completed as follows:

- Enter the benefit area (such as "reduce staffing by one clerk"). Use a very descriptive title.
- Enter an explanation of the benefit area, if necessary.
- Enter the savings (in dollars) per year in the appropriate benefit class under the appropriate risk of attainment level.
- Enter an X in each block for the year or years that the savings will be realized. For example, if the benefit is described as a $5,000 cost displacement likely to occur in Year 2 and is assured of also occurring in Years 3 and 4, then $5,000 is entered in the likely cost displacement box; an X is placed in Year 2; $5,000 is entered in the assured cost displacement box; and an X is placed in Years 3 and 4.
- One benefit analysis form is completed for each benefit identified.

To clarify this procedure, let's apply this process to a system that improves productivity sufficiently to reduce a clerical staff by one person ($12,000 per year). The user is confident the position will be eliminated, and the job is targeted for eradication during the second year of operation. Finally, the organization has agreed it will track only the benefits for three years from the point of implementation. In this scenario, the following is entered on the form:

Benefit area: Eliminate one clerk.

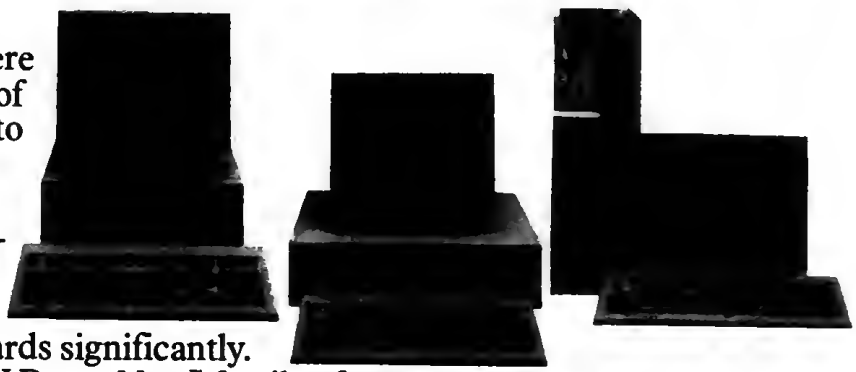
Explanation: System improves productivity of clerical staff sufficiently to reduce staff by one person. The learning curve associated with the new system makes this possible in Year 2.

Benefits: $12,000 is entered in the cost displacement or avoidance area in the assured column, and an X is placed in 2 and 3 to indicate the savings started in Year 2 and continued through Year 3. (Had the firm agreed to track savings for five years, an X would also have been placed in Years 4 and 5.)

The benefit summary (see chart page 62) is a recap of the details found in the benefit analysis form. One benefit summary is compiled for each year in the following manner:

- List the benefit area from the benefit analysis form on the left side of the form.
- Enter the benefit dollars in the correct comfort index column based on the comfort index numbers listed on the benefit

THREE NEW WAYS TO SHOW YOUR DISDAIN FOR MEDIOCRITY.



In a world where a startling number of products are made to standards that are somewhat less than exacting, NEC presents a trio of products that elevate those standards significantly.

It's the APC IV PowerMate™ family of personal business computers: PowerMate 1, PowerMate 2 and the multi-user BusinessMate.™ They're part of a new line of AT-class PCs that give you the kind of power and speed you need to take your productivity—and your creativity—to the limit. And with the latest addition to the family—our brand new PowerMate 386—you can stretch that limit even further.

So even though life may indeed be a series of compromises, we don't think you should have to settle for one in the office. Not when you can get the name of your nearest NECIS reseller just by calling 1-800-343-4419 (in MA 617-264-8635). In Canada call 1-800-387-4313. Or write to NEC Information Systems, Department 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

Take it to the limit.

NEC

C&C Computers and Communications

analysis form. Repeat the process for each benefit until all benefit dollars for that year are entered.

- Total and enter the comfort index columns at the bottom.
- Calculate a cumulative total (one through nine as applicable).
- Repeat this process for each year with benefits, preparing one summary sheet for each benefit year.

What does it cost?

The bottom line is the financial analysis, which consists of three items: a bar graph, a payback period calculation and an internal rate of return calculation. To develop the bar graph, first take all of the annual costs for developing the project and for its postimplementation operation. Then plot the project costs by year below the horizontal axis. Cumulative benefits for comfort levels 1 through 3, 4 through 6 and 7 through 9 (see chart this page) are plotted above the horizontal axis. The result is an informative graphic representation of both the cost and the return at the three points.

A payback period is then calculated by dividing cumulative benefits for comfort levels 1 through 3, 4 through 6 and 7 through 9, respectively, by the total cost for the project. The result is the amount of time it will take to recover the investment.

Next, calculate an internal rate of return for the cumulative benefits at comfort index levels 1 through 3, 4 through 6 and 7 through 9 using standard calculations. The results can be interpreted as follows:

- Computer-based systems offering rates of return in excess of the opportunity costs of capital for comfort levels 1 through 3 are always considered a very good investment.
- Systems that do not offer a rate of return in excess of the opportunity cost of capital for comfort levels 1 through 3, but do so for comfort levels 4 through 6, are a marginal investment.
- Systems that do not offer a rate of return in excess of the opportunity cost of capital for comfort levels 1 through 3 or 4 through 6, but do so for comfort levels 7 through 9, are always a poor investment.
- Never invest in projects that do not offer a rate of return in excess of the opportunity cost of capital for comfort levels 1 through 3, 4 through 6 or 7 through 9.

Making this process easy to use is key to employing the benefit analysis process effectively. The procedure described here lends itself well to a personal computer spreadsheet application. If you take the time to initially set up the forms and calculations, a significant amount of drudgery can be removed from the process in successive iterations or in successive applications.

Sit down with the potential user of the computer-based information system and go through each of the benefit areas. Assist the potential system user in establishing a dollar value for the benefit.

Finally, I suggest incorporating this process into a formal or structured development methodology for projects that are projected to exceed some targeted investment level, such as $25,000 to $50,000. It is hard to justify the manpower investment required to go through the benefit analysis process for smaller projects.

Remember the proper role of an information services professional is to act as a facilitator in the benefit analysis process. The system user understands the system's benefits. The information services professional, who understands the process, can reduce bureaucracy and alleviate hesitancy. •

Benefit summary form

Calculate the dollar value of benefits for a single year in each benefit area and then rate that value based on how certain users are to achieve it

Benefit area	Comfort index 1	2	3	4	5	6	7	8	9
Keypunch operators	$120								
Warehouse ordering clerks	$180								
Keypunch/data communications equipment	$114								
Indirect cost displacement									
Reduce inventory-carrying cost	$65		$20						
Absorb growth/Cost avoidance									
Headquarters administrative personnel					$80				
Increase productivity/efficiency									
Buyers					$35				
Better control through earlier awareness									
Reduce inventory write-offs		$875			$475				
Fewer plant changeovers		$150			$150				
Fewer lost orders, returns		$340			$225				
Improve customer service									
Product availability knowledge				$140			$280		$320
Total benefit dollars	$429	$1,365	$20	$140	$930	$5	$280	$80	$320
Cumulative total	$429	$1,694	$1,714	$1,854	$2,784	$2,789	$3,069	$3,129	$3,449

Cost displacement or avoidance Management control Strategic performance

CW CHART

MANAGEMENT

TAKING CHARGE

David Ludlum

Stopping the buck

As information systems managers aspire to broader business roles — or find themselves forced into them — one of the most crucial challenges they face is the need to effectively delegate responsibility. The same has always been true of information systems professionals moving into management.

That need presents upwardly mobile professionals and managers with the opportunity to garner some practical lessons from the partial paralysis inflicted on the Reagan administration by the exposure of the National Security Council's efforts to run guns to Iran in exchange for hostages and to divert proceeds to arm Nicaraguan rebels.

Analyses of the Iran-Contra affair have repeatedly pointed to a breakdown of Ronald Reagan's characteristic hands-off management style as one of the major reasons that the program was allowed to gather momentum until it spun out of control.

Since his days as governor of California, Reagan has been known for a management style characterized by delegation — avoiding operational details while concentrating on a handful of fundamental principles. Obviously, the philosophy worked well, as Reagan was elected to a

Continued on page 70

Guide scouts end users, CIM

Telecommunications, DB2 are also major concerns, president says

John Nack, manager of the processing network division at Caterpillar, Inc. in Peoria, Ill., is the only person to have been elected to two terms as president of Guide International, Inc., the organization for users of large IBM systems.

Nack, whose second two-year term ends in November, was interviewed recently by *Computerworld* staff members Stanley Gibson, Michael Sullivan-Trainor and David Ludlum in Boston at Guide's 68th meeting, which was attended by some 4,600 representatives of the group's corporate membership.

John Nack

For Guide members, is this really "The Year of the Customer?"

I don't think this is the year of the customer any more than previous years, other than in the use of the phrase. We are not getting a whole lot more attention because it's the year of the customer, because we were getting a lot of attention in the first place and we had been getting attention for a number of years.

IBM seems to be a little more open these days, with regard to the press and analysts, about future products. Is your company getting more information than you did in previous years?

No. There still are no preannouncements at all. But there has been a very open dialogue in recent years. In the last four or five years, it has been getting more and more open.

Your view is that IBM is now trying to bring some of that openness to groups other than Guide?

Yes. I believe that they are now sharing more openly with the press and other customer groups things they used to share with us. However, with us, it has never reached the point where we believe we are seeing their entire strategic plan and product announcements in advance of the public.

With regard to the recent creation of the Application Systems Division, I had not heard any rumors about it until we came here. It was a closely held secret from us.

What do you think of the creation of the new division?

It is hard to tell what to think about it yet. I haven't sorted it all out yet, but it would seem to me that anything they can do to emphasize applications development — organizationally or whatever — is good news for all of us.

Are there any hot topics that seem to be coming up among members?

No more and no less than usual. This is not an event. This goes on continuously, this process. Three times a year we get together, and we exchange information.

However, one of the things we are doing now is putting an emphasis on CIM [computer-integrated manufacturing]: trying to get our organization to have a better representation among those who work with CIM, such as manufacturing engineers —

Continued on page 69

INTERNATIONAL BANKING

MIS profit, Swedish style

BY JANET FIDERIO
CW STAFF

When employees receive their salaries by direct deposit in Stockholm, chances are their money won't stay in their checking accounts for long.

Because of aggressive management of information technology, Swedish banks can offer to deduct customers' checking account funds and transfer them directly to creditors. The banks do this to pay not only monthly bills such as mortgages but also anything from purchases of stocks and bonds from the Swedish stock exchange to child-care expenses.

For example, if you worked in Stockholm and banked with Skandinaviska Enskilda

Continued on page 68

PETER PERRY

Inside

BOOK REVIEW

The brave new world of thinking machines

BY CHARLES P. LECHT
IDG NEWS SERVICE

The Tomorrow Makers
By Grant Fjermedal

Want some fun summer reading? Subtitled *A Brave New World of Living Brain Machines*, this book chronicles the author's visits with people who work on the frontiers of the computer world.

Fjermedal traveled extensively in the U.S. and Japan to write this book, visiting such erudite places as MIT, Harvard University, Carnegie-Mellon University, the U.S. Naval Research Laboratory, The Smithsonian Institution and Japan's Waseda, Tsukuba and Tokyo universities.

The author also visits lesser known scientists, like those working in the back rooms of our most advanced laboratories — and even hackers working at home. This makes *The Tomorrow Makers* a refreshing work unburdened by stale statements from the often quoted.

The book is divided into three parts: The Download Factor, Educating Baby and Outrageous Worlds.

1. The Download Factor. At the outset, we are offered the concept of downloading as posited by Hans Moravec of Carnegie-Mellon's world-class robotics laboratory. This involves a process not unlike cloning in its final effect but different in its method. It does not involve creation of the "copy" through the use of biogenetics; rather, a computer simulation of the original is achieved by both medical and computer scientists.

If the simulation were good enough, the prospect of downloading our functional selves into the distant future would be possible. The issue of whether the series of man-made replicants could constitute a self-conscious continuum of the original is unresolved.

As dogmatic as theologians may appear in disputing the ideas that arise through consideration of this, so do our scientists appear to say it is possible.

From here on, we begin an exploration of the world of robotics, computer simulations of intelligence, awareness, motor control — you name it. A virtual smorgasbord of artificial intelligence hardware and software is offered. Dessert comes in the form of the speculations and ruminations of scientists. True, they seem a bit possessed by the technological fare they so gleefully describe, but their enthusiasm is refreshing. What's the good of it all if we cannot dream?

2. Educating Baby. This section presents us some classic and not-so-classic arguments on the feasibility of creating thinking machines and the impact such machines could have on our future. Dialogues with current thinking machines and a potpourri of opinions on what these dialogues mean are offered.

What is particularly compelling about this section of the book is the very human emanations of those machines — not to undervalue the scientific fare.

It is natural that the thinking machine issue be accompanied by a religious one. St. Thomas, a world-class logician and perhaps the greatest Catholic scientist/cleric, deposited the human soul in the intellect and said man possessed it. But thinking takes place in the intellect.

Accordingly, if we say that machines think, some feel that this may lead to the conclusion that machines have a soul — or worse, that man has none. The theological issue regarding man and machine is widely and wildly covered in this fascinating section of Fjermedal's book.

3. Outrageous Worlds. The name of the last part of *The Tomorrow Makers* just begins to hint at the really way-out stuff it holds. Here, we forget about the upsides and downsides of whether or not machines think. The present time is what it is. The question is, Where are we going?

Are biological computing devices possible? And what about androids, like those found in science-fiction movies like *Blade Runner*? Or HAL, Stanley Kubrick's master control computer in his film interpretation of Arthur C. Clarke's *2001: A Space Odyssey*?

Will computer technology ultimately become so advanced that we can expect it to replicate earth-based factories on distant planets without human help? And that they will await our arrival? Can we become pure mind?

On the last page of the book, Fjermedal writes, "There would come a point when we could leave the technology behind and step into the spiritual, perhaps wrapping ourselves into the gentle folds of Einstein's space-time continuum. But even short of that, long before we learn to breathe deeply and pass through time, we may be able to deploy such an array of self-replicating robots for terraforming that we will be able to pass through the stars, leaving in our wake newly formed cradles of life."

Hardcover, $18.95, 261 pages, ISBN 0025385607, by MacMillan Publishing Co., New York, 1987.

Publishers wishing to have their books considered for review can direct books, prepublication galleys, press releases, catalogs or other information to George Harrar, Book Review Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Order HP Workstations. Save $1.89.

Bundled PC Workstation Solutions from Hewlett-Packard.

Buying workstations can be quite a headache.

Evaluating people's needs, surveying available components, ordering, testing and supporting them can turn into a time-consuming hassle.

But because we monitor the way people work with PCs, we've learned to configure and package—bundle together—the most efficient hardware/software combinations for the job.

Our HP Vectra PC workstations come specifically configured for secretarial, professional or desktop publishing needs.

They work in a networked environment. As your needs grow, they can be upgraded.

They're all IBM AT-compatible, and they're all available now.

So to choose the right workstations, all you have to choose is HP.

It's one more example of how the company that never stops asking "What if. . ." makes life easier and more productive for you. Call 1 800 367-4772, Dept. 282Y.

HEWLETT PACKARD

CALENDAR

AUG. 16-22

The Tenth Annual McCormack & Dodge User Conference. Chicago, Aug. 16-20 — Contact: M&D, 1225 Worcester Road, Natick, Mass. 01760.

National Computer Graphics Association CAD/CAM '87 Conference and Exposition. Boston, Aug. 17-20 — Contact: NCGA, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

1987 International Conference on Parallel Processing. St. Charles, Ill., Aug. 17-21 — Contact: Sartaj K. Sahni, Department of Computer Science, University of Minnesota, 136 Lind Hall, Minneapolis, Minn. 55455.

Techdoc Eleven: Graphic Communications Association's Eleventh Annual Conference and Exhibition. San Francisco, Aug. 18-20 — Contact: GCA, Suite 604, 1730 N. Lynn St., Arlington, Va. 22209.

Information Forum for Local Government. Dallas, Aug. 19-20 — Contact: Infomart, Administrative Offices, Suite 6308, 1950 Stemmons Freeway, Dallas, Texas 75207.

AUG. 23-29

Image Scanning and Processing. Monterey, Calif., Aug. 23-25 — Contact: Gail Montgomery, Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Share 69. Chicago, Aug. 23-28 — Contact: Share, Inc., 111 E. Wacker Drive, Chicago, Ill. 60601.

Tex Users Group's Annual Conference. Seattle, Aug. 24-26 — Contact: Tex Users Group, c/o American Mathematical Society, P.O. Box 9506, Providence, R.I. 02940.

The Omni User Second Annual Technical Conference (on IBM's System/34, 36 and 38). Chicago, Aug. 25 — Contact: The Omni User, P.O. Box A 3031, Chicago, Ill. 60690.

The Computer and Automated Systems Association of the SME clinic on Voice Recognition Applications in Manufacturing. Chicago, Aug. 25-26 — Contact: Nancy A. Loerch, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

First Conference on Speech Technology in Healthcare. San Francisco, Aug. 26-27 — Contact: Registrar, Institute for Medical Record Economics, 121 Mount Vernon St., Boston, Mass. 02108.

Software Contracts. Seattle, Aug. 27-28 — Contact: Registrar, Batelle Seminars Program, P.O. Box C-5395, 4000 N.E. 41st St., Seattle, Wash. 98105. Also being held Sept. 14-15 in Boston and Oct. 5-6 in Chicago.

AUG. 30-SEPT. 5

The National Conference on Network Publishing. Dallas, Aug. 31-Sept. 2 — Contact: Interactive Features, Inc., 28½ Cornelia St., New York, N.Y. 10014.

Show CASE Conference II. St. Louis, Sept. 1-2 — Contact: Center for the Study of Data Processing, Campus Box 1141, Washington University, One Brookings Drive, St. Louis, Mo. 63130.

Computer Aided Publishing CAP'87 West. Los Angeles, Sept. 1-3 — Contact: Computer Aided Publishing CAP, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

5th Anniversary PC Expo. New York, Sept. 1-3 — Contact: PC Expo, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Thirteenth International Conference on Very Large Data Bases. Brighton, England, Sept. 1-4 — Contact: VLDB 87, The Conference Department, British Computer Society, 13 Mansfield St., London, UK W1M 0BP.

SEPT. 6-12

Banque '87 — The 6th European Trade Fair for Techniques and Organization in Banking. Copenhagen, Sept. 7-9 — Contact: Bella Center A/S, Center Blvd., 2300 Kobenhavn S, Denmark.

SIBOS: SWIFT's International Banking Operations Seminar. Montreal, Sept. 7-11 — Contact: Society for Worldwide Interbank Financial Telecommunication S.C., Ave. Ernest Solvay 81, B-1310 La Hulpe, Belgium.

Decworld '87. Boston, Sept. 8-18 — Contact: Public Relations Department, Digital Equipment Corp., 200 Baker Ave., Concord, Mass. 01742.

1987 Capital Microcomputer Users Forum. Washington, D.C., Sept. 9-10 — Contact: Jackie Voigt, National Trade Publications, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

The Desktop Publishing Confer-

ence. Santa Clara, Calif., Sept. 9-12 — Contact: Seybold Seminars, 6922 Wildlife Road, Malibu, Calif. 90265.

Distribution/Computer Fall Expo '87. New Brunswick, N.J., Sept. 10-11 — Contact: C. S. Report, Inc., P.O. Box 453, Exton, Pa. 19341.

SEPT. 13-19

Vaulting the Barriers to EFT Success. Washington, D.C., Sept. 13-15 — Contact: Linda Munday, Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

13th National Conference of North American Honeywell Users. Cincinnati, Sept. 13-17 — Contact: Les Pacca, NAHU, P.O. Box 2037, Willingboro, N.J. 08046.

The First Annual Conference on Expert Sytems in Financial Institutions. New York, Sept. 14-15 — Contact: Conference Administrator, Institute for International Research, Inc., Suite 600, 9301 Wilshire Blvd., Beverly Hills, Calif. 90210

Atre Annual Forum on Data Base. New York, Sept. 14-16 — Contact: Atre International Consultants, Inc., P.O. Box 727, 16 Elm Place, Rye, N.Y. 10580.

Data Storage 87. Santa Clara, Calif., Sept. 14-16 — Contact: Forum Management, Cartlidge & Associates, Inc., Suite M-259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

7th Annual Conference on Control, Audit & Security of IBM Systems. Chicago, Sept. 14-17 — Contact: MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

Integrated Manufacturing Solutions '87. Long Beach, Calif., Sept. 14-18 — Contact: Intertec Communications, Inc., Building 33-34, 2472 Eastman Ave., Ventura, Calif. 93003.

1987 Electronic Printer and Publishing Conference. Miami, Sept. 14-18 — Contact: Jean O'Toole, CAP International, Inc., One Snow Road, Marshfield, Mass. 02050.

ICCC-ISDN '87 ... Evolving to ISDN in North America. Dallas, Sept. 15-17 — Contact: International Council for Computer Communication, c/o Bell Communications Research Corp., Room 1B349, 290 W. Mount Pleasant Ave., Livingston, N.J. 07039.

CAM-I Industrial Automation Standards Conference & Workshop. Chicago, Sept. 15-18 — Contact: Annette Van Hauen, Computer Aided Manufacturing-International, Inc., Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

The National Association of Bank Servicers' Annual Meeting. Seattle, Sept. 15-18 — Contact: NABS, Suite B, 5008 Pine Creek Drive, Westerville, Ohio 43081.

Workshop on Computer-Assisted Map Analysis. Corvallis, Ore., Sept. 16-17 — Contact: Joseph K. Berry, School of Forestry and Environmental Studies, Yale University, 205 Prospect St., New Haven, Conn. 06511. Also being held Oct. 24-25 in Berkeley, Calif.

Information Systems Consultants Association's Second Annual Conference and Consultants Market. Atlanta, Sept. 18-19 — Contact: ISCA, Inc., P.O. Box 467190, Atlanta, Ga. 30346.

SEPT. 20-26

Interex North American Conference of Hewlett-Packard Co. Business Computer Users. Las Vegas, Sept. 20-25 — Contact: Interex Conference Department, 680 Almanor Ave., Sunnyvale, Calif. 94086.

Management Information Systems for Strategic Advantage. Philadelphia, Sept. 20-25 — Contact: Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104.

Systems Integration in Multivendor Environments: Dataquest, Inc.'s Business and Office Systems Conference. Littleton, Mass., Sept. 21-22 — Contact: Dataquest, 1290 Ridder Park Drive, San Jose, Calif. 95131.

Integrated Services Digital Networks. San Francisco, Sept. 21-22 — Contact: Customer Service, Frost & Sullivan, Inc. 106 Fulton St., New York, N.Y. 10038.

CD-ROM Expo. New York, Sept. 21-23 — Contact: IDG Conference Management Group, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701.

Corpcon Corporate Microcomputer Exposition and Technical Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

Office Technologies Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

Engineering Workstations Confer-

Continued on page 70

Swedish MIS

FROM PAGE 63

Banken, or S.E. Banken — the largest bank in Sweden — the deposit of your salary could, if you wished, trigger a series of transactions.

First, funds from your personal checking account could be transferred immediately into a family account that both you and your spouse could access. Second, a certain percentage of those funds could once again be automatically transferred to a separate "budgeting" account from which bills could be paid.

But you wouldn't need to pay your bills by writing individual checks. A third transaction, triggered by the arrival of funds in the budgeting account and the date, would transfer budgeting funds to your mortgage, car loan or utility creditors. The only payments you would need to make manually would be those that you didn't expect.

S.E. Banken provides these services for individuals along with a slew of commercial services for its business clients — everything from small business cash management programs to foreign exchange. The institution is one of the 15 largest banks in the world in foreign exchange. From its 360 branches, it serves 1.3 million customers, almost one-sixth of Sweden's 8.3 million citizens.

This Swedish banking customer *can buy stock at his local branch.*

DP on its own

What is unusual about S.E. Banken is not just its level of customer services, compared with American standards, but that it recently set up its DP department as an independent business unit.

SEB Data, as the unit is called, is managed strictly as a commercial profit center for the bank. What this means, says SEB Data's Chief Executive Officer Thomas Gluck, is that S.E. Banken is committed to using technology to automate bank functions — in part to cut down on labor costs, but also to attract customers with creative services such as direct payments. It is seeking to sell applications to other banks as well.

But what fuels SEB Data's competitive management spirit? According to Gluck, there is one simple drive behind every move that Swedish bankers make, and that is a very sensitive approach to costs. "Sweden is a cost-intensive society," he says. "Labor is expensive in Sweden. It makes a difference to us if we can run a branch with 10 people instead of 40. Taxes are high. This means that in order to offer anything to our people, bankers are forced to improve cost efficiency."

Gluck adds that while there is a very strong competitive drive in Sweden, there is also a great interest in cooperation where it can increase the sophistication of services.

For instance, Swedish banks cooperate in a check truncation system that allows any customer to cash a check in any bank, regardless of whether his account is with another bank.

Mother of invention

"We do that for cost-efficiency reasons," Gluck says. "Otherwise, we would have to open so many more branches to handle our customers, (and) we can't afford it." The goal, he claims, is to keep building new levels of competition on these layers of cooperation.

But SEB Data is not relying solely on its relationship with S.E. Banken for its revenue. Not only are SEB Data managers constantly looking for additional revenue-producing services to offer old and new banking customers, they also aim to become a supplier of vertical-market banking applications. They are actively courting banks in Scandinavia, Europe and even the U.S. that might be interested in buying their proprietary systems.

To do this, the SEB Data managers set up a joint venture with Enator AB, a large high-tech consulting firm in Stockholm. SEB Data provides the applications and know-how; the new venture, named Senator AB, provides the systems, consulting and maintenance.

WHAT IS unusual about S.E. Banken is not just its level of customer services but that it recently set up its DP department as an independent business unit.

In effect, the SEB Data management team is reselling the proprietary software that helped the firm become the largest banking group in Scandinavia. However, it has brought in a partner to help handle the sales, setup, consulting and maintenance, so it doesn't have to develop its own support structure.

Looks out for No. 1

SEB Data keeps its primary client competitive with a centralized system consisting of three IBM 3090s, IBM Systems Network Architecture (SNA) networks and proprietary custom-designed software.

The bank's branch office network is based on IBM 4700 financial products. Through SNA connections, almost 6,000 IBM 3270 terminals communicate with host systems located in Stockholm. Every terminal can reach every system. There is no distributed processing.

There are four cornerstones to the SEB Data information system strategy, according to Anders Lindqvist, managing director of Senator AB.

First, SEB Data provides its S.E. Banken customers with a real-time operating environment. "The world is real-time," Lindqvist says, "therefore, all systems should be real-time."

S.E. Banken set the real-time goal in 1972. Now it is possible, for example, for a customer to walk into any office, ask a teller the current price of a certain stock and, based on that information, place an order that can be confirmed on the spot.

This is possible because the central system keeps up-to-the minute quotes on share prices and because customer transactions are also updated in real-time.

Share alike

In addition, SEB Data maintains a common data resource for its banking system. "All information should be accessible to anyone and any application in the total system," Lindqvist says. S.E. Banken went with a centralized system, he claims, because it still has not found the technology that will allow it "to truly share all data within a distributed system." The data center system, therefore, is based on IMS and DL/I, with all files centrally located.

"There is no local intelligence whatsoever," Lindqvist asserts. "We have an integrated system with a common data resource that operates in real-time — there is no update afterward."

SEB Data's third goal is to ensure that all applications are able to communicate with one another — application to application. In other words, everything that can be automated should be automated. Currently, 60% to 70% of all transactions done in the bank are never touched by human hands.

To help banking officials make quick decisions, SEB Data's fourth strategy is to keep production and management information systems data apart. The reason: The information needed for executive decision making is not common data but extracts taken from the production data — aggregates and the like.

Gluck says the company's management has concluded that it should take on the challenge of promoting use of the system by others.

"I spent a couple of days in Rome, in Paris, in the U.S., and I met many banking people," he says. "If they can understand the potential of our system, they will invest in our system rather than developing their own, but what we have to learn is how to market it."

Fiderio is a *Computerworld* senior editor.

Betting on exports

"We import micro technology from you, now we would like to export macro technology back to you — applications," says Thomas Gluck, chief executive officer of SEB Data, the MIS arm of Swedish banking giant Skandinaviska Enskilda Banken, better known as S. E. Banken.

IBM, Digital Equipment Corp., Honeywell Bull, Inc., Prime Computer, Inc. and other U.S. vendors may be big providers of technology to Sweden, but Swedish companies are betting that they have something to offer back to the U.S. and to the rest of Europe.

In fact, Sweden has a growing high-tech presence. Not only is it the home of Asea AB, one of the largest robotics manufacturers in the world, but 10% of the world's industrial robots are installed in Swedish manufacturing facilities, according to the Stockholm Information Service.

Sweden exports roughly half of its manufactured goods and, of that, no less than 46% consist of engineering products, according to S. E. Banken. Currently, the segments of the engineering markets that have grown the most dramatically are information-intensive areas such as communications and electronics. The support industries for these markets have also grown dramatically.

Sweden, in fact, harbors a growing number of computer and telecommunications firms. Perhaps the best known is the $4.6 billion-a-year Ericsson Group, which designs and manufactures private branch exchanges and other telecommunications equipment and is nurturing a struggling Information Systems division.

Many of the Swedish computer industry vendors are known for hardware that reflects close attention to ergonomic design and for software with elegant human interfaces.

JANET FIDERIO

Guide

CONTINUED FROM PAGE 63

people who are trying to put together a CIM program.

We are also trying to reinforce two other areas that grew up in the last four years. One of these is automating the end user. That encompasses office automation and business graphics and that sort of thing.

The third area is telecommunications. We have not yet crossed over the bridge where we are attracting enough telecommunications experts, such as telecom managers. We are getting some, but we are not getting as many as we would like.

Do many Rolm Corp. users attend Guide meetings?

Rolm users only come if they meet the Guide membership requirements. However, at this meeting we had the president of the National Rolm Users Group here for the first three days. Typically, what happens is the telecommunications manager goes to the Rolm users group, and the data processing manager goes to the Guide users group. We are trying to cause that to come together a little bit. We are considering having a joint meeting in Chicago in July of next year.

With regard to CIM, do you perceive IBM making a strategic thrust into this field?

Oh, yes. I think there's a big emphasis on the manufacturing end of the business on the part of IBM. They are really behind most other companies in shop-floor technology. It's going to be hard to judge whether or not they're going to be successful.

Is there much discussion about the Personal System/2, particularly since there is the perception that it is a machine for MIS?

We're typically a little slow in reaction to new product introductions. We will hear an awful lot from individual members, but the organization hasn't yet really focused on them. In general, I would say that it's a good offering. It's an attempt to put an intelligent workstation on a network. But until we get some population of PS/2s and some hands-on experience with them, there won't be a focal point at Guide where we can get together and say what's good and bad about them.

Is the same true for 9370s?

Yes. There's a lot of talk about 9370s but nothing really solid. Our users like to hear stories about people who have PS/2s and 9370s, not just that someone plans to get one. That won't even buy you a drink. Maybe next year we will hear more.

At every Guide meeting, the group submits a list of "requirements" to IBM. What major requirements have kept coming up?

One of them has been a common architecture across IBM's product line. IBM announced Systems Application Architecture, which was in answer to what was, in one form or another, a requirement for the last 10 years.

Would you also consider the 9370, which is extending the 370 architecture to the mid-range, an answer to your requirements?

I suppose so, but we have not had any top 10 requirement in the last 10 years that had to do with IBM's hardware — that it be faster, smaller or whatever. We have been reasonably satisfied with their hardware.

We're after better management tools to manage the hardware; better software tools, so it can be used more quickly and better. We have a major effort in applications development productivity. That has been one of the top 10 requirements for the last 14 years. And we are emphasizing it again this year.

What do you think about the Solutionpac concept — putting together software packages for specific vertical markets?

The Solutionpac concept is a good concept. I'm not sure how successful it's going to be. But I believe there are a large number of small to mid-range computer installations where Solutionpacs could be a good answer to reducing application development problems.

Another thing IBM is emphasizing on the software side is DB2, isn't it?

DB2 is one of the very active projects that we have. There is a lot of interest and a lot of energy going into DB2; in how to tune it and how to better understand what its requirements are for higher speeds. We don't have any reliable statistics about the use of DB2 among our members, but my sense is that there is a real groundswell of usage.

Guide is planning a major symposium in San Francisco in September. What do you hope to accomplish there?

We are inviting a large number of well-known speakers in order to attract members of the boards of directors of other users groups throughout the world.

That is the public part of the meeting. But there is a private part that will go on afterward.

To my knowledge, this is the first time we will have brought together all the worldwide users groups in one place. There is no hidden agenda there. We are just trying to get users together to exchange ideas. We will talk about how to better manage users groups to get the most out of them.

Stop the buck

CONTINUED FROM PAGE 63

pair of landslide presidential victories. His management style was often praised as he appeared likely to become the first president since Dwight D. Eisenhower to successfully serve two full terms.

In particular, Reagan's style was contrasted with that of his immediate predecessor, Jimmy Carter, a president whose immersion in the details of White House doings (including the schedule for the tennis court, critics were fond of noting) was often attributed in part to his training as an engineer.

Observers of the White House scene have noted that Reagan's "Look, no hands" management style served him well during his first term, when he enjoyed the services of three loyal, dispassionate top aides of the sort necessary to succeed with such a management approach. James A. Baker III, Edwin Meese III and Michael K. Deaver all met with the president frequently and often presented him with opposing views on major issues.

But observers like former Sen. Paul Laxalt (R-Nev.), a close friend of Reagan, and Brent Scowcroft, a Ford administration national security adviser and a member of the Tower commission that investigated the Iran-Contra affair, have said in interviews with *The New York Times* that the system broke down when the three aides left the White House after Reagan's first term and their counsel was replaced by one voice: that of Chief of Staff Donald T. Regan, who they said sometimes shielded the president from opposing points of view.

Management guru and Claremont Graduate School professor Peter F. Drucker concurs with this view. "The first job of a chief of staff is to make sure that the chief executive officer gets all dissents, conflicting points of view and alternatives," Drucker wrote in commenting on the Iran scandal in *The Wall Street Journal* earlier this year. He underlined the need for a chief of staff to be independent of the competing interests that he is supposed to relate to his boss.

Drucker also underscored the need for the chief executive to clearly define delegated tasks in terms of scope, measure of results and method of reporting and to carefully monitor progress or lack thereof, citing Franklin D. Roosevelt as the greatest delegator in recent American history.

Similarly, Scowcroft cited a need for an executive delegating duties to maintain an inquiring style, which Reagan lacked and which became conspicuous when top aides no longer volunteered a variety of views on issues.

So the Iran-Contra imbroglio points not to the virtues or vices of particular management styles, which may be more or less appropriate for different individuals and situations. Rather, it underscores the need for effective implementation of a given style, incorporating the necessary elements that the style assumes or whose need has been demonstrated by experience.

It's a telling illustration of the need — on the part of both executives and subordinates — for effective interpersonal skills of the sort that aspiring business people, particularly those with technical backgrounds, are constantly being urged to develop.

The executive must encourage and accommodate subordinates' expressions of conflicting points of view. He also must effectively communicate delegated tasks and then maintain control over them while not getting in the way.

In perhaps a greater challenge, subordinates should be willing to test the boss's willingness to hear conflicting advice and must communicate the progress, and any problems, with delegated tasks before they become the talk of the town — or worse.

Ludlum is *Computerworld's* senior editor, management.

Continued from page 67

ence. Los Angeles, Sept. 21-23. Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

CSM '87: Conference on Software Maintenance. Austin, Texas, Sept. 21-24 — Contact: The Computer Society of the Institute of Electrical and Electronics Engineers, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

10th National Computer Security Conference. Baltimore, Sept. 21-24 — Contact: Linda Muzik, Attn: C421, National Computer Security Center, 9800 Savage Road, Fort George G. Meade, Md. 20755.

Ninth Annual Satellite Communications Users Conference. Dallas, Sept. 22-24 — Contact: SCUC '87 Satellite Communications Magazine, Suite 650, 6300 S. Syracuse Way, Englewood, Colo. 80111.

5th Annual 1100 Data Center Management Conference. San Diego, Sept. 22-25 — Contact: Datametrics Systems Corp., 5270 Lyngate Court, Burke, Va. 22015.

Fifth Annual NCR Users Eastern America Conference. Fort Washington, Pa., Sept. 24-25 — Contact: Frank Whalon, c/o Tinius Olsen Testing Machine Co., P.O. Box 429, Willow Grove, Pa. 19090.

INDUSTRY INSIGHT

Clinton Wilder

Rumor mill grinds on

"Control Data Corp. stock soars on rumors of an offer for the firm or a leveraged buy-out."

"NEC Corp. stock plummets on Japanese newspaper report that it may be investigated for illegal technology exports."

"IBM shares drop as second-quarter earnings fall short of analysts' estimates, which were raised in the last few days on rumors of higher profits."

Welcome to Wall Street, 1987 — one of the worst places to go for reliable information about developments in the computer industry. The above three news items from recent weeks illustrate the enigmatic relationship between stock market activity and reality.

Market gyrations based on rumor and hearsay are as old as Daddy Warbucks' paper stock ticker. And the follow-the-crowd mentality of investors certainly dates back to the Crash of 1929.

But this year, the computer industry seems particularly susceptible to such rumors, for a variety of reasons.

Oscillating moods

First and foremost, high-tech investors are in that most unpredictable of moods: They are nervous. Having suffered through the industry downturn of 1985 and 1986, they are understandably skeptical about boom computer stocks. And they have been badly burned by a number of companies, such as Daisy Systems Corp. and Floating Point Systems, Inc., whose rosy pictures of financial health had some hidden, and very dark, clouds.

Earlier this year, riding a raging bull market combined with high tech's own recovery, investors went on a small buying binge that boosted the share prices of a wide range of vendors' stocks. Although the market surge was real, it made some people skittish — ready to cash in their profits and move to greener pastures at the first

Continued on page 74

New blood pumps TRW service

BY ALAN ALPER
CW STAFF

FAIRFIELD, N.J. — As tumultuous as the computer maintenance business has been recently, it is a wonder that an outsider would be willing to enter the fray. But Paul Snyder, the recently appointed vice-president and general manager of TRW, Inc.'s Customer Service Division, seems generally unperturbed.

Snyder, an affable, 49-year-old executive, recently succeeded longtime division head Maynard Smith, who retired earlier this year. Snyder, an 11-year TRW veteran, most recently headed the firm's Electronic Assemblies Division.

Snyder seeks to build on the Customer Service Division's equipment reconditioning and servicing strengths while expanding into software maintenance, consulting and remote diagnostics services. The TRW division and Bell Atlantic Corp.'s Sorbus unit are the industry's largest providers of third-party computer maintenance.

"We've been fixing hardware as opposed to fixing customers," Snyder says. "Our business has moved to become one of asset management for our customers."

Because of the heavy capital investment its customers have made in hardware and software, asset management means making sure customers' equipment is up and running nearly 100% of the time. Anticipating problems through remote diagnostics linked to customers' equipment via modems is a service TRW will continue to evolve, Snyder says.

The division also hopes to beef up its presence in IBM processor maintenance and its servicing of products sold through resellers, he notes. IBM's recent Customer Service Amendment (CSA) overhaul, effective June 1, gave customers 24-hour, seven-day-a-week service and a variety of discounts and will make IBM a tougher competitor, analysts say.

TRW is responding with a program called Service Plus, offering reductions of 10% to 20% on maintenance charges, a price guarantee of two years and 24-hour, seven-day-a-week service at on extra charge.

Snyder says he believes IBM's CSA program is purely a discounting ploy and that little else, in terms of quality of service, has changed. While acknowledging the importance of price, Snyder fervently says that response time and quality of service are just as important.

"The building of a partnership is important," he states.

Continued on page 74

TRW, Sorbus lead top five

Estimated 1986 revenue of leading U.S. third-party maintenance providers

INFORMATION PROVIDED BY BUSINESS DEVELOPMENT INTERNATIONAL
CW CHART: MITCHELL J. HAYES

Industry battling parts tariff

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The computer industry is waging a battle against a U.S. Customs Service ruling that classifies printed-circuit boards containing a CPU as "data processing machines," which are subject to import tariffs as high as 100%.

As a practical matter, the recent Customs Service ruling categorizes a CPU board as an independent computer rather than a computer part. The distinction is important because tariffs on computer parts from Canada and Japan were eliminated by a 1985 trade agreement, while tariffs on independent computers are still enforced.

The import tariff on computers is generally a modest 4.3%, but 16-bit microprocessors imported from Japan are slapped with 100% punitive tariffs as a

Continued on page 73

Inside

Intellicorp seeks commercial markets

Will port AI software to Sun, DEC, Apollo systems; cuts staff by 10%

BY STEPHEN JONES
CW STAFF

MOUNTAIN VIEW, Calif. — Caught in the throes of a sluggish artificial intelligence market, Intellicorp, Inc. is trying to tap a broader list of customers by porting its AI development software from Symbolics, Inc.'s LISP computers to conventional hardware from companies such as Sun Microsystems, Inc., Digital Equipment Corp. and Apollo Computer, Inc.

To make the transition, Intellicorp has shaken up its staff of 200, laying off about 20 and moving some high-level employees from research and development positions to marketing jobs. The company is also starting a vertical marketing push in an effort to cozy up to Fortune 1,000 end users.

"This is an opportunity to structure the company for profitability by simply trying to reach for larger markets for our software," said Thomas Kehler, chairman and chief executive officer of Intellicorp.

In the past, Intellicorp's Knowledge Engineering Environment system, which helps users with little programming experience develop knowledge-based systems, has run only on unconventional LISP computers from Concord, Mass.-based Symbolics. That powerful hardware was needed to handle the many tasks associated with AI, but it failed to attract a large group of customers.

Platforms from companies like DEC and Sun, meanwhile, have reached the power and performance levels needed to develop knowledge-based systems. With those machines accepted as standards in the general-business workstation market, industry analysts agree that portability is the key to the success of AI software.

"If Intellicorp is going to be successful, it's going to have to bridge into the real world," said Charlotte Walker, a senior vice-president with L. F. Rothschild, Unterberg Towbin. "It has to get out of the R&D shop and into the commercial marketplace."

Though the strategy may pay off in upcoming quarters, Intellicorp's sagging bottom line is expected to take a big hit for the year ended June 30. Flat revenue and a series of one-time charges from the new plan — including about $1 million in write-offs for scrapped LISP computers — will result in a loss of up to $4 million on sales of about $22 million for the year, Walker said.

Sales for the fourth quarter, which Intellicorp is expected to report on today, will be about $6 million with a loss of $2 million, Walker estimated.

Sample applications

Instead of selling primarily to LISP developers that are interested in experimental R&D work, Intellicorp said it plans to target developers that want to write programs for general-purpose commercial markets on conventional hardware. Such applications include systems that help run computer-integrated manufacturing and programs that diagnose and repair telecommunication systems.

Continued on page 72

Televideo to acquire Zentec for $30.8 million

Purchaser achieves long-time quest, hopes for revival of OEM business

BY JULIE PITTA
CW STAFF

SUNNYVALE, Calif. — Televideo Systems, Inc. said last week it had signed a letter of intent to acquire fellow terminal maker Zentec Corp. in Santa Clara, Calif., for approximately $30.8 million in cash and stocks.

Under the proposal, Televideo will exchange 8.7 million shares of newly issued stock for all outstanding shares of Zentec stock. The merged company will retain the Televideo name. Additionally, Televideo will acquire all outstanding shares of Zentec preferred stock for $9 million in cash.

Zentec's base of OEM business proved attractive to Televideo, which has been frustrated in its attempts to penetrate that market. "We definitely need that OEM business," explained Robert Sheffield, Televideo financial vice-president. "And their terminals offer a lot of emulations we don't have. They bring to us a little different technology."

About 70% of Zentec's $27 million in revenue last year was the result of OEM sales. Televideo's OEM business has been virtually nonexistent, and the company has suffered from flat sales in recent months. For the quarter ended May 1, Televideo reported earnings of $341,000 on sales of $21 million.

Subject to shareholders' approval

Sheffield said the merger is expected to be finalized before the completion of the fiscal year, which ends Oct. 31. It must be approved by the shareholders and boards of both companies.

Production of Zentec's line of display terminals eventually will be transferred from its leased plant in Mexicali, Mexico, to Televideo's wholly owned production plant in Korea, Sheffield said. However, a schedule for that transition has not been set.

K. Philip Hwang, Televideo's chairman and chief executive officer, will be chairman of the merged entity, while Zentec President William Parker will become president. No chief executive officer will be named, Sheffield said.

Cash-rich Televideo, with about $65 million in reserves, has been seeking an acquisition for more than a year. Its proposed acquisition of Alpha Microsystems, Inc. last year fell by the wayside after a letter of intent was signed [CW, Oct. 27, 1986].

Motorola settles technology suit

PARIS — Semiconductor maker Motorola, Inc. recently said it has settled a breach of agreement suit filed by the Thomson-CSF division of French defense and electronics company Thomson SA earlier this year.

Thomson had sought damages of about $525 million. The financial terms of the out-of-court settlement were not disclosed.

Filing in the Tribunal of Commerce in Paris Feb. 2, Thomson alleged that Motorola had "anticipatorially" breached a technology transfer agreement relating to Motorola's 16- and 32-bit microprocessors.

Under terms of the out-of-court agreement, Motorola is expected to transfer certain technology to Thomson-CSF in exchange for payment from Motorola.

After that technology transfer is completed, Thomson will reportedly dismiss the suit.

Intellicorp

CONTINUED FROM PAGE 71

Intellicorp has started shipping development programs that run on the DEC Vaxstation and the Sun 3. That has helped the firm win over customers such as McDonnell Douglas Corp. in St. Louis, which has reportedly purchased 30 of Intellicorp's Knowledge Engineering Environment systems to run on Sun workstations.

Intellicorp expects to announce similar products for the Apollo DN300 and 570 series this quarter and for the IBM RT Personal Computer next year, said Lisa Sheeran, an Intellicorp spokeswoman.

While Intellicorp CEO Kehler emphasized that LISP users will not be abandoned, he said that within a year, software for Sun and DEC machines should make up 75% of sales.

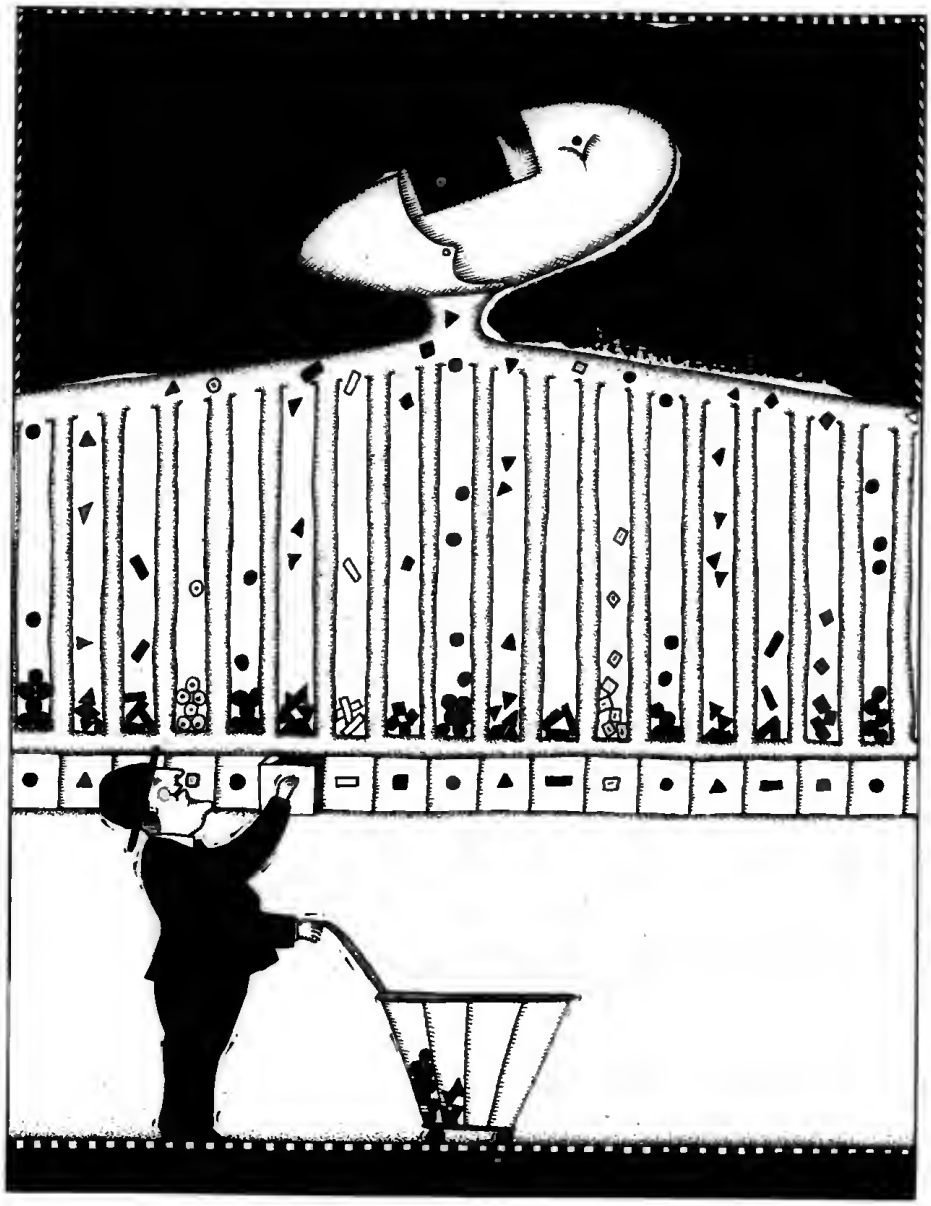
William Higgs, director of software research for Cupertino, Calif.-based Infocorp, said waning customer interest in the AI industry is forcing firms such as Intellicorp and Teknowledge, Inc. to make the move to mainstream applications.

"Most companies in the AI industry haven't experienced the growth they anticipated," Higgs said. "Emphasizing the practical elements of AI and its practical payoff is the first necessary step toward success."

COMPUTERWORLD

SPOTLIGHT

DBMS: MEDIUM AND LARGE SCALE



The search for flexible and nonthreatening data base management systems has led to relational technology. The approach isn't new, but now the times and the tools are right.

MOST DBMS PRODUCTS ARE BUILT ALONG THE SAME LINES.
HOW THEY PERFORM IS SOMETHING ELSE.

When you first look at relational DBMS products, the similarities are obvious. They're all built around SQL. Most include 4GL tools. They all have an impressive range of features and functions. And they all claim to deliver performance.

But once you get your hands on these products, the differences are dramatic. It's the craftsmanship in designing, building, and assembling quality components that differentiates a master's instrument from a beginner's.

That's why professionals from the world's most discriminating organizations are selecting INGRES as their instrument of choice.

And why INGRES was voted "best DBMS/4GL" by *Digital Review* for two years running.

No wonder. INGRES has been designed from top to bottom to support developers of performance-critical applications.

It offers a superb 4GL environment that helps you get applications running quickly. And makes them easy to maintain. Better yet, with INGRES/STAR you can orchestrate applications across your organization including data on mainframes, minis, workstations, and PCs.

To boost performance, INGRES uses the industry's most sophisticated query optimizer and other performance tuning facilities to ensure your applications run at top speed.

With this kind of performance, INGRES attracts a lot of new customers. But it's our reliability and support, that keeps them. INGRES delivers such a high level of satisfaction that 99% of our customers stay with us, year after year.

The most important thing about a DBMS is the way it performs for you. And that's why we'd like you to experience INGRES.

Just send this coupon or call us. And we'll show you what a fine instrument INGRES really is.

Yes, I'd like to see how INGRES performs. Please: 107

☐ Send me more information about INGRES.
☐ I'd like to attend a free INGRES seminar in my area.
☐ I'd like to know more about the INGRES sampler.
☐ Have a salesperson call me.

Name_____

Company_____

Title_____

Mailing address_____

City_____ State_____ Zip_____

Telephone_____

Mail to: INGRES,
Relational Technology Inc.
1080 Marina Village Parkway
Alameda, CA 94501-9891
Or call: 1-800-4-INGRES

INGRES
Relational Technology Inc.

INSIDE

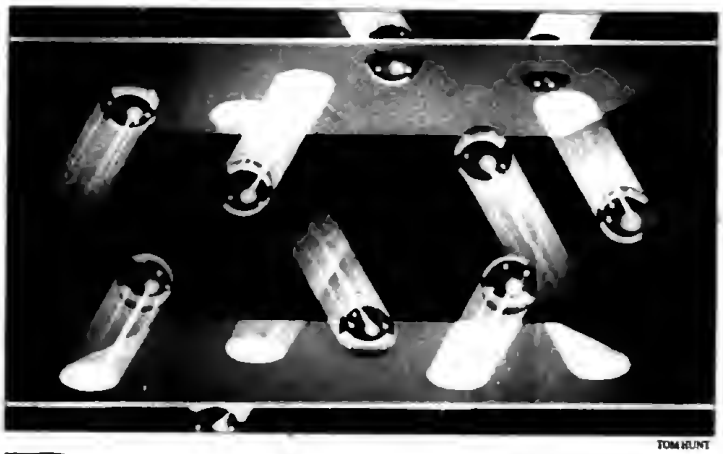
SENIOR EDITOR
Joanne Kelleher
ASSOCIATE EDITOR
Penny Janzen
RESEARCHER
Sally Cusack
DESIGN EDITOR
Marjorie Magowan
ASSISTANT RESEARCHER
Bonnie MacKeil

Cover illustration:
Franklin Hammond

In a climate of open exchange and peaceful collaboration, applications would move freely among competing systems.

THE IMPERATIVE OF COEXISTENCE

BY RICHARD SKRINDE



TOM HUNT

Peaceful coexistence is a subject very much on the minds of many data base-dependent organizations. Their concerns do not have anything to do with armament policies, trade negotiations or relations between the superpowers. It is system compatibility, not diplomacy, that is preoccupying users of medium- and large-scale data base management systems technology.

The task these users are faced with is one of reconciling the present with the future. A new generation of relational DBMSs has emerged, which promises many benefits — but only if it can be successfully linked with existing application architecture. Technology coexistence is the term being applied to the goal of merging new technology into traditional system structures and, like global issues of collaboration, the desired end is a lot clearer than the necessary means.

Security Pacific National Bank is an example of an organization stationed at the forefront of DBMS technology and trying to deal with the issues of technology coexistence. Security Pacific has been a traditional IBM IMS hierarchical data base shop and has developed many ambitious IMS-based applications.

Its Host Authorization System, for example, supports a large network of automated teller machines and bank card readers that are used to check payment authorizations. It was developed utilizing IBM's IMS Fastpath and took advantage of every availability and performance feature of this development system. Response time is 0.1 seconds, with hit rates on the system of 15 transactions per second. Bank ATMs have an uptime in excess of 99%, including the time the operator shuts down the ATM for daily service.

Another Fastpath application, a bulk filing system called Total On-us Processing and Services (TOPAS), keeps every transaction for every customer checking and savings account on-line for 65 days. Using advanced facilities such as the multiple-area concept, TOPAS processes four million transactions in less than one hour every night.

In 1985, however, the bank set aside IMS products and switched to relational technology with IBM's DB2. This was a major shift for an organization committed to, and successful with, IMS applications.

Ka-yiu Yu, manager of data base services at Security Pacific, says that as far as the bank is concerned, relational technology is the progressive path. "DB2 or dedicated relational machines like Tandem Computers, Inc.'s Nonstop SQL are the future for us. We have completed nine applications in DB2 and have had such good results that we plan to look at DB2 for every new application. Right now, we are stress-testing the product to see how far you can push it before it quits," he says.

Making the worlds meet

For the moment, Security Pacific is maintaining a strict separation between the two DBMS environments. No relational applications currently have to access any of the data in the older IMS applications. Integration, however, is inevitable. "We know that it will only be a matter of time," Yu says, "before we must develop an application that will have to access both data bases. It is a difficult problem, and we are studying the best way

Skrinde is a data base management consultant based in Alameda, Calif. He specializes in fourth-generation language-based business applications and practices.

Coexistence

FROM PREVIOUS PAGE

to handle it."

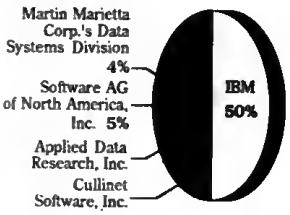
The effort involved in adopting the new technology is substantial, according to Yu, but the advantages are even more significant.

"Applications can be developed much faster," he says. "The cost of maintenance and enhancements is much lower. And, most important, relational technology will support distributed data bases. Transaction processing can be accomplished at many sites, rather than having to ship all of the data to one central site and then attack it with a giant mainframe and IMS Fastpath."

The distributed data base is the ideal response to the expansion that has resulted from the deregulation of the banking industry, Yu explains. "A new node could be set up in the system for a new site without having to do major rework on the applications," he claims.

Large-scale DBMS software

1986 market share



INFORMATION PROVIDED BY INTERNATIONAL RESOURCE DEVELOPMENT, INC.
CW CHART

Expanding the skies

Security Pacific is not alone in its migration of data base architecture. American Airlines maintains one of the largest computer networks in the world. The firm's real-time reservation system supports approximately 100,000 terminals and processes an average of 1,500 transaction/sec., with a three-second response time.

A second real-time system supports flight operations. That system is connected to 20,000 terminals and interfaced to a computer on every American Airlines aircraft to monitor when each plane leaves the gates, takes off or lands. These real-time systems run on IBM 9091 Model 400 mainframes and are tightly coded in Transaction Processing Facility Version 2 (TPF2), an outcropping of Airline Control Program. A third system is a large on-line system called the commercial complex, which supports all corporate business and management activities with applications built using IMS.

American Airlines has a two-stage plan for technology coexistence. For the first stage, the company has developed hardware and software linkages between its on-line and real-time systems.

These linkages have greatly enhanced the airline's ability to manage the information stored in its two massive real-time systems. For example, an agent enters all of the tickets collected for a particular flight into the real-time system. An IMS-based application in the commercial complex extracts this information from the real-time application that has been written in TPF2. This information is then collated by the IMS application to provide American Airlines management with same-day information about the total number of people flying in and out of that airport, as well as all other airports, via a trend line and other reporting formats.

The second stage is to incorporate an aggressive development program that will connect a large relational data base system to the on-line system. That linkage will allow a manager to access the IMS with a relational query, such as, "How many people flew from New York to Boston between noon and 6 p.m. today?" The manager would not need to understand much about computers and could get the information immediately by using a format that could be transferred directly into his word processing or spreadsheet package.

American Airline's goal is to put the tools for managing the critical information contained in the on-line system directly in the hands of managers rather than have them make requests for reports through the DP department.

Joyce Wren, assistant vice-president for American Airline's Data and Application Services, says, "We must do everything possible to help our clients become more productive. Our current project to create a decision-enabling store that will allow users to manipulate data directly is an example of that commitment. We selected a relational approach in order to gain rapid development capabilities and to decrease maintenance and enhancement costs as well."

The project will take several years to fully implement, according to Wren. "It is important to move slowly when converting to relational technology," she states. "Systems people, maintenance people and operations people all have to adjust and accept it culturally."

Removing IMS's blinders

Moving to new technology also involves the major effort of selecting a vendor, as is evidenced by the city of Boston's 1½-year search for an alternative to IMS. Since the city's computer operation was a Cobol VCM shop with a couple of applications created in IMS, initial consideration was given to Cobol productivity tools — screen painters, report writers and code generators. Rather than buy all of these

products from different vendors, however, city officials decided that obtaining a relational data base and getting all of the productivity tools from one vendor made the most sense.

MIS personnel evaluated a lot of vendors, saw a lot of slide shows and talked with a lot of salesmen before selecting CA-Universe from Computer Associates International, Inc. It was, according to Mike Hernon, chief analyst in Boston's MIS department, a tiring process. "It takes a lot of energy," he says, "to drastically change your life, even if it is hopefully for the better."

The process was particularly difficult, Hernon adds, because there were so many close contenders. "There are so many good products out there," he says, "that the MIS shops that are married to IBM and that will only move from IMS to DB2 without ever doing this type of evaluation are really missing something."

The road behind us

Technology coexistence is a complex realm encompassing a wide range of activities, including the creation of new strategies, interface gateways, conversion algorithms and administration philosophies, all of which are aimed at incorporating new relational systems with existing DBMS applications. It is a major issue that vendors, driven by user requirements, are trying to solve, often on a case-by-case basis.

To fully understand all that is involved in achieving technology coexistence, it is necessary to look at the forces behind the evolution of DBMS. Punch cards and magnetic and paper tapes were the sequential devices used to store data in early computers, making information management a sequential process. Update transactions had to be sorted and grouped into batches that could be processed in one sequential pass of the data.

Random-access storage devices advanced the state of information management. One record could contain pointers to any other record, and the storage device could access the records in that order. However, each read or write operation had to be programmed uniquely and at a very low level. A hodgepodge of approaches was implemented.

Access methods such as IBM's VSAM were developed to handle I/O in a general-purpose manner that relieved one level of complication but created another. Low-level I/O constructs no longer had I/O recoded in each application, but the application architecture was so undisciplined that systems would store each piece of data in several formats, and, many times, each new application would result in a new copy of the data. Much development effort was still required to improve data storage and retrieval techniques.

IBM, working jointly with major aerospace firms, developed a pilot DBMS project to oversee the tracking of the many components required for the Apollo space program during the mid-1960s. This pilot program was the original development work that created the hierarchical data model-based IMS product line.

The hierarchical model allows one parent to support multiple children on any node. This tree-like structure forced designers to model applications very carefully, because any design change put application development back to square one.

> "THERE are so many good products out there that the MIS shops that are married to IBM and that will only move from IMS to DB2 without ever doing this type of evaluation are really missing something."
>
> MIKE HERNON
> THE CITY OF BOSTON

The Codasyl Committee was responsible for the first DBMS standard. A data base task group was formed that, by 1971, had convinced the committee to endorse an improved version of the hierarchical model. The new network data model allowed designers to define relationships between any of the nodes without having to navigate back up the tree and down another branch.

An early development project based on the network model was undertaken at B. F. Goodrich Co. It was called IDMS and was ultimately purchased by Cullinet Software, Inc.

Breaking tradition

Traditional DBMS technology had a downside, however. MIS departments were strapped with maintaining and enhancing hierarchical or network-based DBMS applications as corporate needs grew. Programmers likened this effort to having to move boulders.

Enhancement products such as IMS Fastpath were introduced to increase transaction processing capacities for the banking industry. Performance did, indeed, improve, but the already-stressed programmers almost buckled under the even heavier maintenance load.

Existing DBMS technology also repelled many users, who regarded it as hostile and unusable, feeling that their applications could not be expressed by a model that looked like a tree (the hierarchical model) or a spiderweb (the network model).

IBM again went to work, this time on creating a relational system at its San Jose, Calif., research center. The pilot

development that emerged, System R, would later become DB2 and SQL DS.

A start-up company, Oracle Corp., influenced by that development, introduced a product that maintained compatibility with DB2 and differentiated itself with a superset of the SQL user interface. Before long, another relational development project at the University of California at Berkeley resulted in two commercial products, Ingres from Relational Technology, Inc. and CA-Universe from Computer Associates. Following that, the infant Unix marketplace contributed Informix from Informix Software, Inc. and Unify from Unify Corp. Between 1980 and 1982, relational products were released in a steady stream.

Relational-based DBMS products initially promised much but often delivered little. Products ran slow, and file systems crashed. Users gritted their teeth and hung on. By 1985, only five years after their introduction, relational products rapidly matured, becoming quite dependable for decision-support applications. However, traditional DBMS architectures with nearly three times the market maturity still provided better performance and enriched integrity features and retained most of the lucrative on-line transaction processing sector of the marketplace.

Straddling old and new

The latest versions of relational products have now matured to the point at which they are more powerful than traditional data base products in every aspect.

Even vendors that have well-established hierarchical or network products seem to take it for granted at this point that their customer base for those products will want to integrate relational capabilities, if not convert totally to a relational DBMS.

IBM, cognizant of the fact that large investment in traditional technology cannot simply be cast by the wayside, is offering its IMS customers assistance in bridging traditional technology with relational innovation by means of synchronization and automation of critical systems-administration functions. "We are not going to abandon our IMS users," says Donna Vanfleet, senior DBMS product manager for both IMS and DB2. "Our IMS user base influences our development efforts. They know exactly what they need in terms of enhancements, and we work very closely with them."

Cincom Systems, Inc. is also trying to satisfy existing users, who are wedded to the traditional approach, while moving itself decisively into the relational fray. Although active marketing for Total, Cincom's hierarchical product, has been discontinued, the company is still supporting its users, according to Tom McLean, vice-president of marketing and product planning.

"We no longer actively market Total, and I'm sure that IBM's IMS user base has stopped growing as well," he says. "We continue to service the requirements of our Total users, but our emphasis and resources are pushing Supra, our relational data base product."

One notable exception to the "relational-is-better" trend is a product from Officesmiths, Inc. in Ottawa. It is a unique DBMS implementation designed to automate office information. Officesmiths' DBMS incorporates text processing within a hierarchical model. Documents are structured so that each separate heading and paragraph is defined as a text field of unlimited length.

"Relational models are not best for everything," says Officesmiths President Glenn McInnes. "The hierarchical model is the most efficient way to build a data base for documents. This is because documents are inherently hierarchical in nature."

The standards trend

Open architecture designs allow connection of different manufacturers' systems to build computer networks. Standard network protocols, standard communications protocols, the Posix operating system standards and the X-Open standards all support distributed environments.

Users benefit because their applications can be moved from one environment to another with little reprogramming. Chrysler Corp., for example, has utilized computing based on open architecture standards to help build a competitive edge, and DBMS plays a crucial role

Installed base for medium- to large-scale DBMS software

Projected growth by equipment category, 1987 to 1991

	1987	1988	1989	1990	1991
Minis	824,100	1,068,000	1,343,400	1,634,400	1,937,500
Superminis	89,100	124,600	170,100	227,000	297,200
Mainframes	163,800	202,300	247,800	299,200	355,400
Minisupers/ supers	4,620	6,140	7,920	9,840	11,740

INFORMATION PROVIDED BY INTERNATIONAL RESOURCE DEVELOPMENT, INC
CW CHART

in that effort.

The Detroit-based Outer Drive Manufacturing Technical Center (ODMTC) has implemented a relational DBMS to support loading, cost estimation, equipment scheduling and tracking and the establishment of manpower standards. The relational DBMS selection team looked for a system that would allow applications to be developed quickly and easily, be flexible enough to allow development on a module-by-module basis and allow end users to analyze their data.

Joe Bulat is the manager of computer-integrated manufacturing (CIM) at the Chrysler ODMTC. "We want to spend our energy building cars, not data base applications," he says.

"Ingres from Relational Technology gives us an open-architecture solution that provides us with three key features: distributed access, application longevity and portability. Portability means freedom from hardware vendors and the ability to finally distribute our information management. We look to our vendor to provide the gateways required to connect our new relational DBMS technology to older information systems," he explains.

The hardware glove

Hardware has actually leapfrogged software, with advances like very large-scale integration circuit technology, high-density memories, communications controllers and video controllers.

Users have become accustomed to the polished look of bit-mapped graphics interfaces and to the instant response time of local processors.

"Accessing data using a character-based terminal attached to a DBMS residing on the corporate mainframe is like a time warp into the previous century for these users," says Carol Adams, office automation product manager for Sun Microsystems, Inc.

What the power of relational DBMS systems demands, according to Sharon Weinberg, president of Codd and Date Consulting Group, is the complementary power of parallel processing.

"Parallel processing is the computing architecture of the future, and relational technology fits it like a hand in a glove," Weinberg remarks. "A single relational request will execute a stream of instructions to perform many tasks that can be done in parallel. This is a lightning-fast operation when a CPU can be assigned to each task."

Contemporary supermicrocomputer architecture can provide millions of instructions per second (MIPS) for a price fifteenfold better than a mainframe, according to Kent Godfried, marketing manager for Sequent Computer Systems, Inc. "Our parallel processing computers use tightly coupled parallel processing techniques that consist of banks of low-cost 32-bit microcomputer modules. These banks can be expanded linearly to make systems grow with customer needs."

Sequent offers a range of tightly coupled parallel processing systems that incorporate up to 30 CPUs, providing close to 100 MIPS of processing power in a single computer that can support more than 400 users.

Also targeting this market is Tandem, which is just completing beta testing of its Nonstop SQL, a parallel-architecture relational DBMS machine.

Data base machines
1986 market share

INFORMATION PROVIDED BY INTERNATIONAL RESOURCE DEVELOPMENT, INC.
CW CHART

The entry-level system can handle 200 transaction/sec. and, because of parallel architecture, can be expanded to more than 1,000 transaction/sec. Tandem supports distributed data bases with its Network Transaction Management Facility. Rollback and Rollforward recovery as well as two-phased Commit and Presumed Abort allow distributed users the transparent ability to perform updates across multiple nodes with high data integrity.

Another interesting relational product targeting the same market is Sybase from Sybase, Inc. in Berkeley, Calif. Significant architectural improvements from a multithreaded data server and stored procedures have given this SQL-based system the speed to handle aggressive applications such as on-line transaction processing.

Caterpillar, Inc. has a large MIS shop, which has been a cornerstone of the IBM IMS community, having been involved in the initial development of IMS. In 1986, the CIM group at Caterpillar made a decision to adopt relational technology for future application development.

A distributed hardware architecture is now in place, using DB2 running on a mainframe and linked to a network of Digital Equipment Corp. VAXs and Apollo Computer, Inc. workstations using Oracle SQL Star technology. Development is performed in the VAX and Apollo environments using Oracle, and completed applications access data stored on the mainframe. About 400 tables have been completed since the beginning of this year, with the largest having about 12 million rows.

The purpose of the relational DBMS system, according to Dick Lenz, senior

technical support specialist at Caterpillar, is to store manufacturing and design control information. The shift to relational will, it is hoped, provide a dynamic environment more suited to the changeable nature of manufacturing information and will allow the Caterpillar CIM group to manage and control information more easily than they could with IMS, Lenz says.

Lenz claims be is pleased with the outcome of the change. "Oracle solved our heterogeneous hardware problem. It is the kind of thing that you read about but don't really believe works. We wanted to do this project properly, so we took our time and developed a logical design of data within the organization. Our technology coexistence strategy, and major hurdle, is to be able to develop transition programs that access both our IMS data and our relational data."

There is no way users can do this on their own, according to Lenz. "We have to look to the vendors for support," be says. "We are looking to IBM or Oracle to provide us with key tools, such as an SQL interface to IMS."

Another example of the trend toward the migration of data base management from mainframes to minicomputers is provided by Boeing Computer Services Co. in Seattle. Boeing recently commissioned Integrated Automation, Inc. to develop a drawing and document storage and retrieval system. The system, which has the Ingres DBMS as its heart, runs on a network of DEC VAXs with 700M bytes of magnetic storage devices and 64G bytes of optical-storage devices.

Operators use high-resolution displays to check the quality of engineering and documentation drawings fed in by many types of high-speed scanners. Once a drawing has been successfully input, it can be called back from the data base at will and examined or revised. Laser printers or plotters are able to give users hard copy, if desired.

Integrated productivity tools

Fourth-generation languages and related productivity tools such as report writers, screen painters and code generators all help developers speed applications from concept to final product.

With the upsurge of interest in application productivity and portability, such tools have also become important for the buffering they provide between the application and the hardware and operating system. "The key to solving the technology coexistence issue," says Ron Hank, senior manager for corporate relations at Cincom, "is to have a language integrated into the DBMS so that the combined product completely handles all interfaces. Users can then move their applications from one environment to another, without having to change a single line of application code."

Amex Life Assurance Co. in San Rafael, Calif., which is using Cincom's Supra relational DBMS on an IBM mainframe with Cincom's Mantis application development language, has found that, with the productivity of these tools, more time can be spent on the philosophy behind the application rather than on the details of the implementation architecture and application coding.

Amex spent one year developing a strict entity relationship model of the company. The entity relationship model was developed in conjunction with a business model that defined the business rules of the company, and groups of users were interviewed by the MIS data designers in two-day joint application development meetings.

> "THE KEY to solving the technology coexistence issue is to have a language integrated into the DBMS so that the combined product completely handles all interfaces."
>
> RON HANK
> CINCOM SYSTEMS, INC.

After these models were completed, a processing model was developed that showed which applications were on-line, which were to be batched and how data flowed between procedures. Finally, a technology model was developed that defined the hardware and software that would be used to implement the systems.

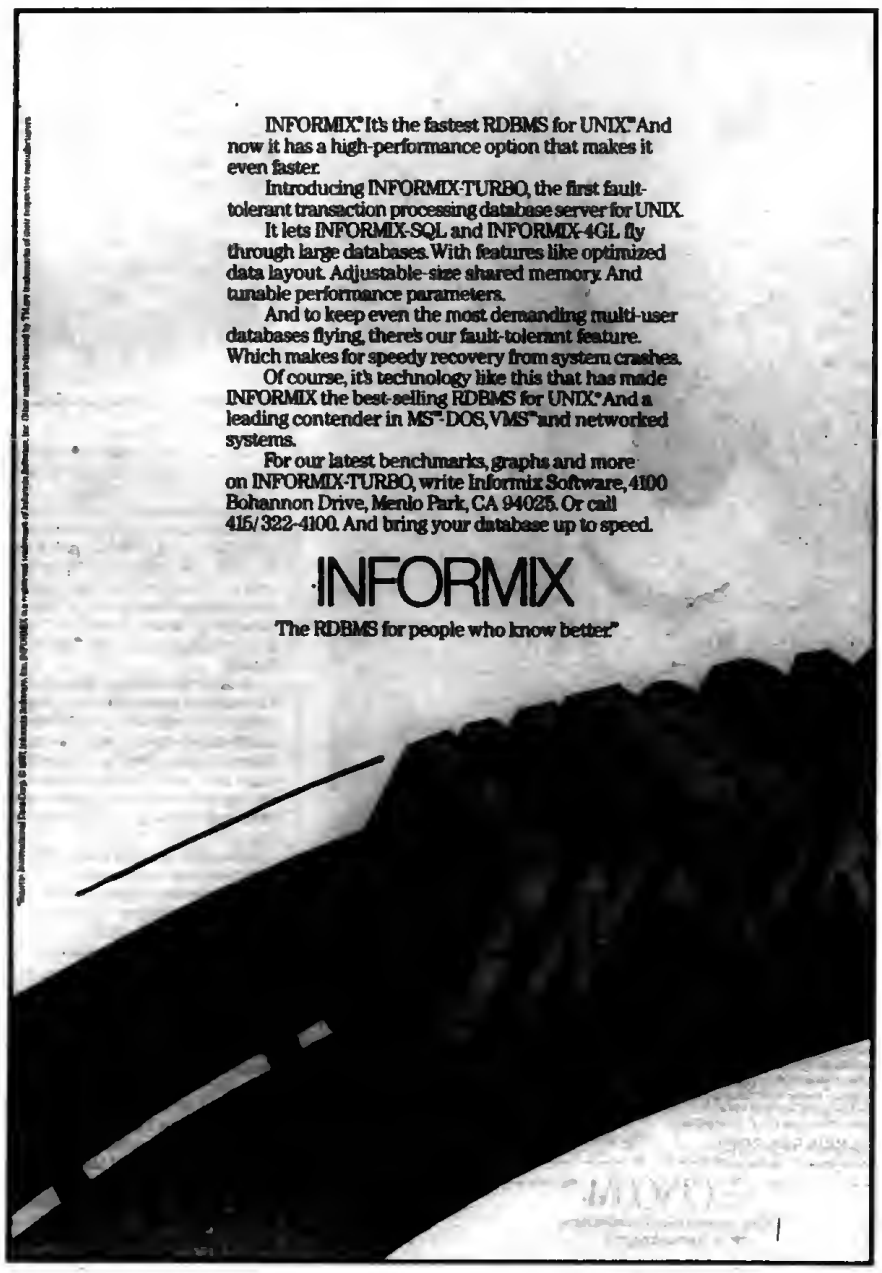
"It was a very interesting process to witness," says Lee McGee, data analysis specialist. "My senior management took the time to sell the other executives in the company on the importance of the process. Interacting with people and watching their reactions as they learned to think about our business from a modeling point of view was very worthwhile."

As Amex's time investment indicates, data modeling, once regarded as an academic exercise, is now considered a crucial step in the development process, largely because of the increased complexity of data base projects.

"Data modeling is not an esoteric pastime," says Chris Turnbull, president of Zanthe Information, Inc. in Nepean, Ont., "but a very effective tool that helps data base designers to better solve real-world problems.

"In 1977, Peter Chen of MIT published a paper describing the entity relationship model, which constituted an important extension to the relational model. The model views the real world as being composed of groups of 'things' called entity sets and the relationships that we know

Continued on page S8



INTERVIEW
RELATIONAL COMES ON-LINE

Robert Epstein, 34, is executive vice-president and cofounder of Sybase, Inc., as well as chief architect of the Sybase System. Previously, be was vice-president of development at Britton Lee, Inc. and principal architect of its data base machines. In the late 1970s, he served as project manager for the Ingres project at the University of California at Berkeley. Epstein recently spoke with Richard Skrinde about the direction he expects the market for relational data base management systems to take.

Sybase claims to provide the first relational DBMS for on-line applications. What is the market response?

People are moving toward more aggressive, more interactive applications. And often, they are finding they must move toward new technologies to support those applications.

We're finding essentially two types of customers. The first type is the existing relational DBMS user. These people are now looking at building applications with stringent performance, integrity and availability requirements not provided by current relational DBMS products.

We also see new users who have never used a relational product before because all their applications require a level of function, speed and support that were previously not provided by relational DBMSs.

Hierarchical and network data base systems provide the performance, availability and reliability required for on-line transaction processing. So why use relational DBMSs?

This gets back down to the inherent benefits of relational systems — productivity, flexibility and maintainability, as well as built-in decision support capabilities.

Your data base is a mirror of your business. And, as things change in the external world as well as in corporate policies, your data base and applications must reflect those changes.

Relational DBMSs allow you to make those changes much more easily than with hierarchical or network systems. Also, when users need to run ad hoc queries on data, they don't need to transfer it to a relational system; they can actually have the decision support component built right in.

What does it take for a relational DBMS to support on-line applications?

The three primary distinguishing features between on-line and decision support ad hoc applications are performance, availability and data integrity. There is no inherent reason why s relational DBMS cannot provide these capabilities. But the emphasis on relational systems up to this point has been on productivity and ease of use.

The founding of Sybase was oriented toward the vision that the market would evolve and start to demand that SQL be the only data base framework. Well, this couldn't happen if the product didn't have the ability to provide on-line support. And to achieve that, you have to build a new architecture from the ground up.

That architecture had to incorporate some of the things that worked with the hierarchical and network products, which are known for their high-volume performance and operational features.

What relational DBMS software architecture is required to support on-line applications?

What we've got is a requester-server architecture. Requester-server architecture is a term that is beginning to be used quite a bit, so let me explain the three fundamental concepts behind it.

The first is the clear separation between the front-end application and tools and the data base engine. The second component is that the data base engine itself, rather than the operating system, has to manage multiple users and multiple processes. We call this multithreaded server architecture. Finally, the third fundamental component of requester-server architecture is the notion of moving transaction-integrity logic, or programming intelligence, into the data base itself.

Some of this we've taken from the mainframe world.

Multithreaded server architecture is a good example. This concept comes from the fact that, in the mainframe world, the data base, not the operating system, handles multiple users concurrently. Moving the data integrity from the application into the data base was done with the notion of adding procedural logic in the data base, and products like IMS and IDMS provide capabilities like this.

Is Sybase going to support users trying to migrate out of hierarchical and network data bases?

The first goal for aiding conversion is coexistence. Applications are not static; they grow and change. Our goal is to use Sybase's distributed technology and open architecture to allow people to complement existing applications with new functions in Sybase. Sybase then acts as an application driver in existing application environments to insert and retrieve data.

To provide coexistence, you have to provide gateways to machine environments where you can send transactions to those machines and have them translate it into IMS, IDMS or whatever application environment they are currently running under. And then it must be possible to pull that data and extract it back into a Sybase environment as part of a full transaction or report.

What about distributed data bases?

There are a lot of issues with distributed. Right now, it's a technology in its infancy. And there are s few vendors who are attempting to provide a distributed solution — Sybase is one of those companies. Ultimately, it is our belief vendors will have to work together to provide a solution that is totally distributed.

Today, we are providing transparent distributed update capabilities, complete with s two-phase commit protocol. We've implemented this first because in on-line applications, update capabilities are much more crucial than retrievals.

The requester-server architecture is especially important in distributed architecture. The ability to store data integrity in the data base allows for multisite integrity. This is key in establishing distributed data bases across multiple sites.

Robert Epstein ALAN WITSCHONKE

Imagine the reaction of a person responsible for a data base in one city to the possibility that someone else, in a city be has never heard of, will be able to update his data base. There is no way that first person will allow that to happen unless be can control the kinds of updates that will be made.

What environments are you planning to support?

We've identified several strategic hardware environments we intend to support. Our strategy is to remain focused on those hardware environments. Because we are so oriented to performance, we can't afford to trade off performance in order to support a wide range of systems.

Currently, our system runs on VAX/VMS and Sun Unix, and we support the networks that are used to tie these hardware systems together. Our focus is on VAX, on the IBM mainframe, on s few key Unix systems and, of course, the personal computer. •

Coexistence

CONTINUED FROM PAGE S6

exist between these things." Zanthe has created a data base product, called Zim, that allows data base designers to define a data base in terms of the entity relationship model, saving them the chore of having to convert a model into relational or traditional data base format.

Many vendors are focusing on speeding the process of developing a data model into a finished application. Data Language Corp. has specialized in this integrated language and DBMS approach with a product called Progress, which has received much critical acclaim. It was selected by NCR Corp. to be the vehicle for all future in-house development.

Applied Data Research, Inc., developer of the powerful Ideal language environment, was impressed enough with Progress to purchase the source rights to integrate it into its product line. Data Language Corp. is just releasing an application generator that will help speed application development with Progress.

Another developer, Unify Corp., has opted to create a relational DBMS application development tool for the Unix and DOS environments. The product, called Accell, is said to help developers build transaction-oriented processing systems faster by using an event-driven system in which users fill out prompts and select items from menus. The resulting application is then linked to the data base.

Focus from Information Builders, Inc. is a strong product that is gaining momentum as it is migrated to more and more machine environments.

It is SQL, however, that is destined to become the Cobol of the data base world. SQL is a key component in linking disparate data base architectures. It is the only language interface to a data base that offers any kind of standard across manufacturers. This is very important to large organizations trying to tie many data base systems into a network as well as to value-added resellers (VAR) that are interested in moving applications from one data base product to another.

Natural language interfaces are a specialized subset of the category of productivity enhancement tools. Natural language products, available from companies such as Intellicorp or Natural Language, Inc., serve as front ends for query languages and provide a conversational means of accessing and retrieving data.

Technology brought to life

Data base technology has reached a plateau at which the tools exist to create extremely sophisticated applications. A shortfall occurs in the supply of skilled people who have sufficient understanding of how these new tools can be applied. To some extent, this gap is being filled by a growing cadre of VARs who are working to integrate relational DBMS technology into existing applications.

One example of this activity is provided by McDonnell Douglas Corp., which is acting as a VAR for Oracle in the computer-aided design (CAD) market. Recently, McDonnell Douglas interfaced the Oracle DBMS to its Graphics Design System (GDS) CAD system and created an interface product called SQL CAD.

> "HAVING superior technology is no longer the trump card in this business. . . . The relational DBMS vendor that flourishes will be the one that provides the best support."
>
> PETER TIERNEY
> ORACLE CORP.

Paul Scarponcini, product manager for DBMS and knowledge-based products at McDonnell Douglas Information Systems Group, explains what the addition of relational data base capability contributes to the product, "Users are now able to do some extraordinary things," he says.

"For example, the blueprint of a building could be created in GDS, and then a set of tables defining the attributes of the critical objects within the blueprint could be created with Oracle," he continues. "A query requesting the location of all fire extinguishers within the building could be entered into the system using SQL CAD, via its graphical interface. And the GDS would display all of the fire extinguisher locations on the blueprint as a graphic illustration."

Oracle has determined that, before the DBMS market evolves any further, there must be a period of integration and absorption. "Support training and education have been our marching orders," says Peter Tierney, vice-president of marketing at Oracle, adding that the funds raised by making the company public last year were not pumped into technology development or marketing as might have been expected but into the training of more than 250 consultants, the development of a network of 120 VARs and a beefing up of the education and support staff.

"Having superior technology is no longer the trump card in this business," Tierney says. "Before long, every surviving relational data base vendor will have a similar technology, and they will all be excellent. The relational DBMS vendor that flourishes will be the one that provides the best support. Even the largest MIS shops must rely on the vendor for support. Helping users achieve technology coexistence is, at the center, a support issue." •

Developers can't afford dependence on magic

BY STEVEN CANIANO

There's a scene being played out with increasing frequency between application developers and data base managers. It is a confrontational one about false expectations that has its roots in the mythology surrounding relational data base management systems. The dialogue usually goes something like this:

Application developer: "I'm having problems with my system."

Data base manager: "What sort of problems?"

Application developer: "Response time is just terrible. I think it's the DBMS."

Data base manager: "Why is that?"

Application developer: "Well, it just isn't a good product, and, besides, everyone I've ever spoken to says it's a real dog. I think we should convert to another product. I know of a better one."

Data base manager: "Well, before you do that, how about if we get together to discuss your logical and physical data base design?"

Application developer: "My what?!? This is a *relational* system!"

In simpler times, when there were only two kinds of data bases — hierarchical and network — scenes like this were unknown.

The freedom of relational DBMS

In the modern world, there is another technology available to the application developer known as the mystical and magical relational DBMS. As everyone now knows, this wonderful invention frees the application developer from the necessity of undertaking the laborious and highly iterative (and, in most cases, uninteresting) tasks of planning and verification. It is now possible to build applications without even considering what used to take many months of effort. The relational systems allow us to define an application, throw the data base up and enter the "select where" world of data access routines.

Best of all, because so little time is required to build a system and because there are so many other products available on the market, if we get stuck with a lemon it would be a relatively small effort to rewrite the entire application using a new product.

How is it that the relational systems have become immune to the plagues that tormented their forefathers? Well, the truth is that they haven't, and anyone who believes otherwise will more than likely exhaust their fiscal year's software budget faster than you can say "fourth-generation language."

A relational DBMS is really not magic, regardless of what you've been told. It is merely a sophisticated piece of software, and it is only as smart as you allow it to be. All the issues that existed with hierarchical and network DBMSs are still present in the relational world.

The beauty of a relational data base is that the programmer can be oblivious to the fact that the storage structure of a table has changed. However, this does not mean it is no longer necessary to be aware of storage structures. On the contrary, a data base should be built by a data base designer who has learned the requirements for an application and has carefully made choices by weighing access strategies against key selections, indexing techniques, secondary key selections and file placements.

If accesses are not carefully planned and users are given the freedom to access the data base in any imaginable manner, performance will go flying out the window. This would also be true of a hierarchical or network system. The difference is that while in the latter case people would think twice about traversing many segments and links of a data base because of the enormous complexity involved, the relational model encourages ambitious queries.

So why are so many people blind to the fact that relational data base design is a skill just as network data base design is? Why is it that people who work so hard to write efficient application code allow a piece of software to control the heart of their system? Why is it that when people hear the word "relational," they suddenly believe in magic?

One reason is the undeniable simplicity of the relational model. This is an excellent feature when you want to prototype an application or build a simplistic data base. It is this idea of simplicity, however, that causes many of the relational products to earn bad reputations.

Part of the fault also lies with the vendors of the relational products. In an effort to sell as many systems as possible, they have, at times, done their products an injustice.

Many systems have been sold to unsuspecting end users with no reference to the importance of data base fundamentals. Customers have been led to believe it is the product that performs and that the manner in which you use the product is irrelevant.

Between this misinformation and the fact that the systems are so easy to use that "anyone can do it," it is not surprising that the result has been poor data base designs. The vendors have, in effect, made data base designers of us all, and there are now many people building relational data bases who have never even heard of data normalization.

Even more sophisticated users fall prey to sales pitches that concentrate on the bells and whistles and promises of maximum performance, but leave out details such as what you have to do to achieve the promised efficiency.

The worst part is that there is no screw you can turn, no query you can optimize more efficiently, no turbo engine you can add to the DBMS that will cure a basic case of poor data base design.

A user's first impulse is to point the finger of blame at the DBMS. After all, it was supposed to deliver the best performance without any effort, and it's not performing. The logical conclusion to this, of course, is to go out and buy a better product. And the cycle continues.

So who profits? Certainly not the user. After buying at least two relational DBMS products (which are far from inexpensive) and rewriting an application, probably using the same flawed data base design techniques each time, the user is stuck with a huge software bill, a system that still doesn't perform well and the prospect of having to call in a highly paid consultant to analyze his application and redesign the data base.

What about the vendors? Do they benefit? Possibly, but only in the short term, because eventually the misuse they are encouraging will rebound and blacken the reputations of what may, in fact, be very good products.

What can be done

So what is the answer? Unfortunately, there is no one answer unless we choose to turn our backs on the very real advantages that relational DBMSs offer.

The vendors could help the situation greatly by putting more emphasis on the workings of the relational model and on solid design and maintenance techniques. They should stress that good performance isn't automatic but depends on what a user does with a product.

Much of the application rewriting and data base conversion going on today could also be avoided if developers would look more closely at the relational DBMSs they have before looking for solutions in still another purchase. Chances are, a competent development group could write a successful application using any of the popular packages available today.

The real solution does not lie in DBMS selection but in data base design. Just because relational DBMSs are gifted with great flexibility and adaptability does not mean that we can afford to lose touch with the art of data base design. ●

Caniano is a member of the technical staff at AT&T in Piscataway, N.J. He is responsible for the evaluation and recommendation of DBMS products for the Unix operating system within AT&T.

ACCESS
SNAPP

"We sell power equipment. And now we've got a powerful system to handle our information management needs. It's a secure feeling to know that your development tools are as good as the people you hire to use them."

Hexie McDonnold

Hexie McDonnold
Director of Data Processing
Snapper Power Equipment
A Subsidiary of FUQUA Industries, Inc.

S IDMS/R.
PER DID.

Mowing down the competition in the outdoor power equipment business takes more than quality products. The efficiency of accessing information throughout the organization is what ultimately puts you on the cutting edge. That's why Snapper – a DOS shop – turned to Cullinet's IDMS/R.

By replacing their COBOL system with Cullinet's integrated relational architecture, Snapper has been able to maintain large databases and provide everyone instant access to information. And with ADS/OnLine – Cullinet's fourth-generation programming language – Snapper has been able to cut and trim applications development time and costs.

Cullinet's comprehensive information management technology is the root cause of some impressive Snapper results. A new bill of materials format, for example, now provides both engineering *and* production data with up-to-the-minute accuracy. IDMS/R has improved access to inventory, order status, current pricing, current costs, finished goods status and credit information.

Snapper's small staff has been able to develop large claim services – including group medical and co-op advertising, promotions and warranty service credits. And Snapper has found greener pastures in IDMS/R's automatic recovery feature that ensures availability of data.

For more information on how your company can access Cullinet through IDMS/R, call toll-free 1-800-551-4555. Or write to Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

Cullinet

An Information Technology Integrator
For The 80s, 90s And Beyond.

Now available to OEMs and VARs.

PRODUCT FACE-OFF
IDMS/R excels at volume, DB2 at complexity

BY JAMES BRADLEY

Two of the most important data base management systems on the market are IBM's DB2 and Cullinet Software, Inc.'s IDMS/R. Perhaps the best way to compare these two systems is to begin with what they have in common, which is that both are fundamentally network systems.

The term "network," first applied to Codasyl systems in the 1970s to differentiate them from hierarchical data base systems, has now become almost synonymous with the approach used by Codasyl systems such as IDMS/R. Unfortunately, this can be confusing, since it does not help distinguish Codasyl systems from relational systems that are also fundamentally network systems, such as DB2, which began to be important in the 1980s.

What exactly does this mean? A data base is basically a collection of files that are related. With a relational data base, the files, as seen by users, are rather restricted in format — no variable-length records and no duplicate records are allowed. In more technical terms, the files are of a restricted type known as relations. With a Codasyl system, the files are not restricted to relations, and variable-length records are allowed, although they are not common; thus, in practice, most files in a Codasyl data base will often qualify as relations. Therefore, from a practical point of view, we can often ignore the fact that relational data bases are made up of a more restricted kind of file than Codasyl data bases.

Network vs. hierarchy

In saying the files of both types of data base form a network, we mean a network as opposed to a hierarchy. If the files of a data base form a hierarchy, we have a pyramid structure, with one file at the top called the root file. Call this File A. At the next level, there could be Files B and C. File A will be the parent of B and C. This means that for one A record there are many related B records as well as many related C records.

In the hierarchy, B will be the parent of some child files at the next level down, perhaps P, Q and R; similarly, C may be the parent of child files W and X and so on through the hierarchy.

In such a hierarchical structure, every file except the root file has a parent, or equivalently, every file has zero or one parent files. It was structures such as these that IBM's IMS was originally designed to manage.

If a structure of related files does not form a hierarchy, it must form a network, for in a network, at least one file will have more than one parent. Both relational and Codasyl systems can handle just about any data base structure and are therefore both network systems.

This last statement needs some qualifying, however. What connects the files in any data base structure is relationships. One-to-many relationships, which are by far the most common in all data bases, generally connect the files of both Codasyl and relational systems in a network.

The methods employed in handling these relationships are, however, quite different.

Codasyl systems handle one-to-many relationships by means of a construct called a Codasyl set, in which each element of the set consists of a parent record together with its child records. Commonly, such sets are implemented by means of pointers embedded in the records of the files, as with IDMS/R.

With relational systems, the one-to-many relationships are handled by a variety of methods that may or may not involve pointers. DB2 does permit the use of pointers, although these never have to be specified by the person defining the data base; in contrast, an IDMS/R Codasyl data base definition requires pointer specifications.

What is common to relational systems like DB2 and Codasyl systems like IDMS/R is that both of the system types can manage data bases that have a network structure, and the files of the network are connected by one-to-many relationships implemented differently in the two system types.

However, there are other types of relationships besides the common one-to-many type.

There are also many-to-many relationships. Again, both relational and Codasyl

Bradley specializes in data base management at the University of Calgary. He is the author of *File and Data Base Techniques* (1982), *Introduction to Data Base Management in Business, 2nd Edition* (1987) and *Case Studies in Business Data Bases* (1987), all published by Holt Rinehart & Winston in New York.

systems can handle these, since, even though Codasyl systems were designed specifically for one-to-many relationships, a many-to-many relationship always breaks down into a pair of one-to-many relationships.

A major point of difference arises between the two types of systems when they confront a reasonably common but poorly understood type of relationship called a co-relationship.

Co-relationships can be handled easily by relational systems, but not at all by Codasyl systems. The problem with a co-relationship, as far as data base management systems following the Codasyl model are concerned, is that it has no one-to-many aspect that will allow the Codasyl set structure for one-to-many relationships to be used.

Relational systems, on the other hand, manage relationships by equating field values in related files, so that essentially any kind of relationship can be handled, one way or another.

A richness of relationships

This brings us to the essence of the difference between Codasyl and relational data base management systems. Even though both systems permit the management of network data bases, the network data base in the relational case may be made up of files connected by a richer variety of relationships than in the Codasyl case.

This richness and the resulting flexibility has made it possible to design nonprocedural languages of immense power to manipulate relational data bases. The SQL language for DB2, which has been widely implemented in a variety of other relational systems as well, is the best example. Codasyl systems have no language that can compare.

Cullinet has added a relational front end to its Codasyl IDMS system, calling the hybrid system IDMS/R. However, it does not permit the use of SQL, which is rapidly becoming the standard nonprocedural data base language.

With a nonprocedural language, you specify the processing required instead of constructing a routine to specify how it should be carried out. With relational systems, the required processing routine is generated automatically from the specification in SQL.

If the relational front end of IDMS/R does not permit the use of SQL, what does it do? It permits the use of views, something that is easily possible with relational systems using the nonprocedural language SQL but not with Codasyl systems.

With an SQL expression, you can specify the construction and retrieval of what is essentially a new file formed from data in multiple files of the data base. If this new file is specified as a view (with SQL), it can then be used for further manipulation by SQL. This facility can be useful when a complex SQL expression is needed to construct the view, but only simple SQL expressions are needed to manipulate it afterward. Without the view facility, complex SQL expressions would be needed with every manipulation of the data involved.

IDMS/R provides two facilities for handling views. One is the logical record facility that permits a view to be formed from a Codasyl data base. The other is automatic system facility (ASF), which permits a data base to be defined with files that are relations, with no need for Codasyl set definitions for the one-to-many relationships. This type of ASF-relational data base is manipulated procedurally within a program and can be manipulated nonprocedurally at a terminal in a restricted fashion by Cullinet's Online Query.

IDMS/R is fundamentally a Codasyl system with some facilities of a limited nature similar to those commonly found in relational systems. In contrast, DB2 is close to being a true relational system with all the flexibility that that entails.

In summary, IDMS/R is fundamentally a Codasyl system with some facilities of a limited nature similar to those commonly found in relational systems. In contrast, DB2 is close to being a true relational system with all the flexibility that that entails. Nevertheless, both can handle a network-structured data base whose files are connected by common one-to-many relationships.

It might look from this discussion that DB2 is undisputedly the better system. However, "better" is a subjective term, and it would be wise to ask, "better for what?"

There is no doubt DB2 rests on a superior foundation. However, this superior foundation and the powerful facilities in DB2 take their toll when it comes to ordinary transaction processing. For processing simple transactions with only a few data base files connected by the common one-to-many relationships, DB2 is currently significantly slower than IDMS/R, mainly because of the sheer amount of DB2 code that has to be executed per transaction.

Thus, for ordinary transaction processing with ordinary data bases, IDMS/R will do the job and do it very well. DB2 will do things that are either very difficult or even impossible with IDMS/R, such as nonprocedural manipulation involving offbeat relationships. If that is what you require, then DB2 is indeed the better system. ●

Tracking the nation's trees, bees and bears

BY JOSH BRACKETT

If you work for the National Park Service at any one of its 337 sites in the U.S. and you have termites, you can use the service's central data base management system to get rid of them.

After you log on to Common, as the system is called, and choose Pest Management from the menu, you answer a branching series of questions the system uses to diagnose such problems. After pinpointing the problem, Common suggests an environmentally benign solution, if there is one. If there isn't one, or if the solution suggested doesn't work, you can use the system to request permission to apply a pesticide.

The idea for the Common system, according to Anne Frondorf, program analyst in the Natural Resources and Environment office in Washington, D.C., stemmed from her office's desire to collect all of the valuable management data tucked away in separate files and data bases at Park Service locations.

At the same time, park staff wanted a way to exchange data about their projects, problems and special resources.

Resource roundup

The national data base system Frondorf and others envisioned would provide regional and servicewide data summaries and cross-disciplinary reports combining, for instance, a park's budget information, acreage numbers, plant and animal observation data, visitor statistics and the name of the local congressman.

Parts of the system were prototyped on the Park Service's Hewlett-Packard Co. 3000, using Image, HP's data base management software. It quickly became evident, however, that Image, a transaction-oriented, hierarchical system, was not designed to handle unanticipated, cross-disciplinary queries.

At that time, the spring of 1985, there were not many truly relational DBMSs available for the HP 3000, however. The Park Service quickly narrowed the field to Relate/3000, sold by Computer Representative, Inc. in Santa Clara, Calif.

Richard Thorson, now systems analyst for the State of Virginia, worked as a consultant for the Park Service during the search. He recalls that the specifications called for a report-generation language that would allow users to generate ad hoc reports on-line and store them for future use, a fourth-generation language for quick application development and the capability to access all of the parks' existing Image files.

Relate/3000 was installed in August, and the first two departmental data bases, containing basic park and natural resources data, were up and running by December. It takes about three months to add a new data base module. Although the Park Service does not endorse products, they seem to be well satisfied with Relate/3000.

Recently, the Park Service produced, for the first time, a comprehensive report on the status of flora and fauna in all of its parks — their condition, threats to their well-being and the money and personnel available to address those threats. This report will provide the documentation necessary for future budget authorizations.

Best of all, Frondorf says, "This is not a static, one-time report." The data on which the report is based is being updated constantly. •

Brackett is a free-lance business and technical writer based in Rockport, Mass.

Visual interfaces: Easy shopping but no browsing

BY JAMES LARSON

Nonprocedural data base languages, such as SQL, allow data base users to describe what data the data base management system should access without having to explain how the DBMS should do it. There are, however, some drawbacks from which nonprocedural data base languages suffer. Users must learn and remember the exact language syntax as well as the names and relationships of the object types in the data base. Browsing through the data base requires repeatedly formulating and executing complete requests.

The possibilities for overcoming these drawbacks include the use of visual interfaces and natural languages.

One method for helping users learn and remember the language syntax and names of data base objects is for the DBMS to display a syntax diagram, a graph whose nodes represent key words and options from the language, and a schema, a graph showing the names and relationships of the types of objects in the data base. A syntactically valid command is formed when a user selects a route through the syntax diagram and one or more of the objects from the schema.

This approach to query formulation is not yet widely available. However, with increased use of sophisticated workstations and bit-mapped screens, it may soon become a viable option.

Query-by-Example

One of the most popular visual interfaces to data bases is Query-by-Example (QBE). With QBE, a user selects the names of the files to be accessed from a menu. The skeleton of a table, containing the name of the file and the name of each field in the file, appears on the screen for each selected file. The user then indicates which records to select, the criteria for joining, or coordinating, records and which fields are to be displayed by entering the values and symbols directly onto the table skeletons.

A popular variation of QBE is a form interface to data bases. A form contains the same information as a table skeleton, arranged in a format similar to paper forms used in many offices.

Users may use a form for either data entry or data retrieval. When entering data, values are inserted into the blank slots of the form. When data is being retrieved, the blanks are filled with values of selected records. Values from each record are displayed on a single form, so the user may page through a set of forms to view multiple records from the data base.

When using QBE or forms systems, it is possible, by moving a cursor across the table skeletons or forms, to enter data-retrieval specifications in any convenient order. There are also fewer syntax conventions to remember than with SQL.

Browsing a data base with QBE or forms is not so simple, however. The user must repeatedly formulate and execute requests rather than navigate through the data base in a smooth sweep.

Browsing consists of four basic operations: structuring, filtering, panning and zooming. Structuring is choosing the organization of the objects to be displayed. In either method, users have little structuring capability because the forms have usually been designed already. In QBE, for example, the user can specify only the columns of the tables displayed.

Filtering is the process of selecting instances of the objects to be examined. Form systems can be used to retrieve records containing specified field values, possibly even for ranges of values but seldom for arbitrarily complex conditions. QBE permits users to enter specifications consisting of simple Boolean conditions, but arbitrary combinations of Boolean conditions are difficult to specify.

Panning is the scrolling or paging of object instances onto the screen. Both QBE and forms systems support panning.

Zooming permits the user to proceed from record to record in an ad hoc manner, familiarizing him with the contents of the data base and allowing him to zero in on desired information without repeatedly formulating and executing data base commands. Neither QBE nor forms systems support zooming.

However, several experimental data base interfaces do allow the user to zoom in or out to view object instances at several levels of detail. The fact that approximations of this capability have begun to appear in Apple Computer, Inc.'s Macintosh applications using windows offers hope that true browsing facilities for data base management systems will soon materialize. ●

Larson is manager of a project to build a user interface management system for an engineering information system at Honeywell, Inc.'s Corporate Systems Development Division in Golden Valley, Minn. He is the author of *Tutorial on Data Base Management*, published by IEEE Computer Society Press.

VENDOR VIEWPOINT
A full house is better than just one of a kind

BY JOHN BIRCH

The major advantage of a relational data base management system is the gain in applications programmer productivity, which has been reported to be two to five times better than with traditional DBMSs. My own experience with relational data bases supports these claims. Not only are these gains found when writing new applications, but they are even greater when modifying existing relational DBMS applications.

What are not often discussed, however, are the particular procedures that must be followed — especially with DB2, the most-publicized relational data base product — to realize a net improvement.

Although most users would like to, few have production on-line transaction processing applications running on IBM's DB2 today. This is because while relational data base systems complement conversational transaction processors such as TSO and CMS very well, they are not a natural match with pseudoconversational transactions such as those in IMS and CICS.

Fundamental differences

Implementing a new CICS transaction processing application for DB2 is easier than implementing the same application for a traditional DBMS, because a relational DBMS truly isolates the application program from the physical organization of the data. There are, however, fundamental differences between a relational data base and a traditional data base.

To begin with, DB2 is set, or multiple-record, oriented, and applications should be designed with sets of records, not single records. If not, poor performance and high-system usage will result, because it will be necessary to introduce complex logic into the application program, and DB2 will unnecessarily repeat a number of data retrievals.

The same principal applies to conversion of existing applications. The worst thing you can do is take an existing application that is single-record oriented and simply replace every VSAM read/write call or DL/1 call with a DB2 SQL statement. The processing overhead described above will take place for each record requested, causing the application runtime to increase enormously.

Instead of trying what many people mistakenly think is the easy way into DB2, it is best to face up to the necessity of a redesign, which may involve changes to data and key structures, as well as application program logic. While you will have to think differently about how you access the data, the net improvement in performance will be worth the effort.

A second major point of difference is that relational DBMSs do not use physical pointers to navigate through the data but use the values in the data fields.

Data modeling is important no matter what kind of data base is used, but it becomes almost mandatory when a relational data base system is used in a transaction processing environment. In the case of DB2, data modeling is critical because DB2 does not currently deal with referential integrity, which is a serious data integrity problem. Until IBM corrects this situation, as it has publicly promised it will in a future release, it is up to the user to remember to build referential integrity checks into the application code.

DB2 does have an optimizer that automatically optimizes data retrieval. However, if the data definition step is not given proper attention, no optimizer can fix inefficient physical data storage.

If you have a traditional DBMS such as IMS already in use, converting its applications to run on DB2 may not be cost effective. A more reasonable strategy is to continue to use the traditional DBMS for high-volume production applications and use DB2 for ad hoc queries and reports, which is a natural fit.

IBM provides a data-extract program that allows users to selectively extract data from IMS data bases, VSAM files and sequential files and copy them into DB2 tables. Once you have put this data into DB2 tables, you can easily write applications that properly use DB2 functions, such as set processing.

Obviously, having two DBMSs is not an ideal situation. However, since DB2 and other relational data bases combine better programmer productivity with high system resource consumption, a two-pronged DBMS strategy may be the only practical approach for installations with high-volume transaction processing applications accessing large data bases. •

Birch is a corporate vice-president of McCormack & Dodge Corp.

VENDOR VIEWPOINT
Higher purposes for data dictionaries

BY L. JEANNE FRIEDMAN

The basic purpose of a data dictionary is to inventory and manage corporate data. MIS organizations have long used this structure to tackle such tasks as data control and administration. However, data dictionaries have more to offer than just another level of control or administration. They can be a key to information integrity and productivity gains in application development.

Data dictionaries inherited a new corporate role in the early 1980s when the position of data administrator came into vogue. Managing information as a corporate resource became the new mission, and the data dictionary became the tool for analyzing as well as collecting corporate data.

In order to fill that role and make good on their promise of dramatic gains in programmer productivity, data dictionaries must, however, offer not only an inventory of data elements and tables but also the tools for defining the data and the business or application rules that operate on the data. What is more, they must make this information automatically available to all applications using the data.

A data dictionary holding application-specific information in this manner can lend tremendous power to an application generator. It allows the generator to use the information in generating a customizable prototype of an application while maintaining the integrity of the business rules defined in the dictionary.

If the data dictionary is a vital part of a data base management system, the rules defined for the dictionary can be controlled, managed and optimized for performance by the DBMS. This integration leads to the largest gains in application productivity and data integrity, because the rules are enforced by the DBMS wherever they apply, such as in interactive applications, queries and Cobol programs.

Taking full advantage

In addition to data descriptions — such as data element names, sizes and types grouped by data tables — that have traditionally been collected in data dictionaries, the following information needs to be defined for a dictionary to take advantage of its power:

- **Presentation attributes.** These refer to information on how data is presented to the user in an application, query or report and includes such items as default edit pictures and column headings.
- **Relationship information.** Relational technology allows the DBMS to relate tables by data values. However, additional information regarding the relationship is of extreme value to applications. For example, a data dictionary could contain information describing the relationship between a department and an employee, such as whether the employee is a department member or manager or is on loan to the department. This information sets the stage for an application generator to create a much more intelligent application.
- **Relationship rules or referential integrity.** One casualty of the demise of older data base storage technologies is the data on relationships that was built into the DBMS itself. The data dictionary needs to provide a means for specifying relationship rules, such as "do not allow the department to be deleted if there are related employees" or "keep the employees if the department is deleted."
- **Validation conditions.** The data dictionary should apply the same validation criteria, such as range checks or lists of acceptable values, whenever a data entity is added or updated, regardless of the application. In addition, the data dictionary should allow the user to specify multiple-field validation algorithms within and across tables.
- **Calculations or derived data.** This is an important area for achieving data integrity and productivity in application development and maintenance. Many data fields in a data base are basically holding tanks for calculations. For example, salary in an employee table is usually the result of a calculation involving hours worked and rate of pay, while order amount in a customer-order table is the sum of line-item amounts, which are calculations involving price, quantity and possibly discounts.

The new data dictionary must accommodate such calculations so they are performed consistently every time an application program calls for the result. •

Friedman is senior product manager of data base and decision-support product planning and management at Wang Laboratories, Inc.

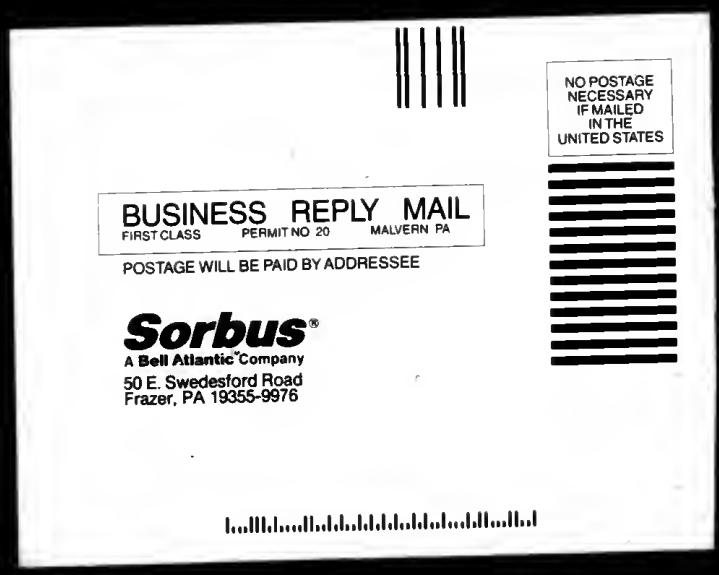
Mini/mainframe DBMS

COMPANY	PRODUCT NAME	OPERATING SYSTEM(S)	TYPE OF APPROACH	QUERY LANGUAGE(S) USED	SUPPORTS CONCURRENT PROCESSING	ACCESS CONTROL TO WHAT LEVEL	INCLUDES A DATA DICTIONARY	DATA BASE ADMINISTRATOR UTILITIES PROVIDED	INCLUDES FACILITY FOR DOWNLOADING TO PCs	PERFORMS DATA TRANSFER WITH WHICH DBMSs	PRICE
Amperif Corp. (818) 998-7066	**RDMI100**	**Unisys 1100 Exec**	**Relational**	**RQL**	**Yes**	**Data item level**	**No**	**Data base dump and load, user identification/authorization, bulk load**	**No**	**Yes (with custom programs)**	**$200,000-$300,000**
Applications Software, Inc. (714) 891-2616	Interrogate	MVS, IMS DB/DC, CICS	Flat, hierarchical, relational to DB2	Proprietary, SQL	Yes	Value level	Yes	Utilities for archival purposes, nature of tracking for DASD storage and library usage by date and volume, determines active terminals and simultaneous sessions	Yes	SAS, Focus, Ramis	Contact vendor
Applied Data Research, Inc. (201) 874-8000	**ADR Datacom**	**OS, VM/VS, VSE, VM/CMS**	**Relational**	**ADR/Data Query (proprietary)**	**Yes**	**Field level**	**Yes**	**ADR/Ideal, ADR/Data Dictionary, ADR/Data Query**	**Yes**	**VSAM, Total, DL/1, IMS/DB**	**From $114,500**
Brudmark Computer Systems, Inc. (713) 621-2606	DB-General	Any HP 3000 operating system	Relational	Fortran	Yes	Any level	No	Capacity changes, structural changes, performance monitoring	No	Image, Turbo Image	$3,500-$6,500
Britton Lee, Inc. (408) 378-7000	**BL8000 series**	**Hardware-based data base system**	**Relational**	**SQL**	**Yes**	**SQL level**	**Yes**	**25 utilities included**	**Yes**	**Standard PC data bases**	**From $300,000**
	BL700 series	**Hardware-based data base system**	**Relational**	**SQL**	**Yes**	**SQL level**	**Yes**	**25 utilities included**	**Yes**	**Standard PC data bases**	**From $125,000**
	BL300 series	**Hardware-based data base system**	**Relational**	**SQL**	**Yes**	**SQL level**	**Yes**	**25 utilities included**	**Yes**	**Standard PC data bases**	**From $17,000**
BRS Information Technologies (800) 235-1209	BRS/Search	VMS, Unix, MVS, VM/CMS	Inverted file structure	Proprietary	Yes	Field level	No	Add users, create menus, performance monitoring and security	No	—	$20,000-$115,000
CRI, Inc. (408) 980-0888	**Relate/DB**	**MPE, AOS/VS, VMS, Unix**	**Relational**	**Proprietary**	**Yes**	**User, file, field, record levels**	**No**	**—**	**Yes**	**Image, Infos, others**	**$15,000-$110,000**
Campus America, Inc. (615) 523-9506	Pose DMS-Plus	VMS, RSTS	Relational	Proprietary	Yes	Screen-level security	Yes	Data base creation and modification, screen formating, report generators	Yes	Any	$19,500-$25,000
Century Analysis, Inc. (415) 589-7600	**Muse/9**	**VIX, VIX/E**	**Relational**	**Proprietary**	**Yes**	**Record level**	**Yes**	**Interactive dictionary creation and maintenance, dictionary analysis by element and subset**	**Yes**	**Works with all NCR file techniques, DBS2**	**$25,000**
Cincom Systems, Inc. (513) 662-2300	Supra	MVS/XA, DOS/VSE, VM/CMS	Advanced relational, three-schema architecture	Spectra	Yes	Row level, every attribute within the row	Yes	Normal for automatic logical and physical data base design, DB Aid for view creation and testing, directory maintenance	Yes	VSAM, IMS, Total, Supra PDM	From $196,000
	Ultra	VMS	Relational	Spectra	Yes	Row level, every attribute within the row	Yes	Directory maintenance, DB Aid, Fast Utilities	No	RMS files	From $20,000
Cognos (800) 426-4667	**Powerhouse**	**MVS, VMS, AOS/VS**	**Relational**	**SQL, proprietary**	**Yes**	**Data item level**	**Yes**	**Data base creation, organization**	**No**	**VAX/RDB, DGS/QL, Infos, VAX/RMS, ISAM, MPE, Image**	**Contact vendor**
Compuserve Data Technologies (617) 661-9440	System 1032	VAX/VMS	Relational-like	Proprietary	Yes	Field, record, procedural, data set levels	Yes	Record descriptors, security provisions, damage recovery	Yes	—	$3,000-$120,000
	System 1022	TOPS-10, TOPS-20	Inverted file, relational-like	Proprietary	Yes	DBMS, data, value levels	Yes	Accounting, security, host-language interface	Yes	None	$16,000-$72,000
Computer Associates International, Inc. (617) 868-1400	**CA-Universe**	**MVS, DOS, VM**	**Relational**	**SQL, QUEL**	**Yes**	**Value level**	**Yes**	**Restart, recovery, backup**	**Yes**	**Through CA-Earl to Adabas, Total, IDMS, DL/1, IMS**	**$140,000-$170,000**
Computer Corp. of America (800) 258-4100	Model 204	MVS/XA, MVS, VM/CMS (including IBM 9370), any OS operating system	Relational	Proprietary	Yes	Field-level security	Yes	On-line performance monitor, add and modify files on-line, backup of files during update	Yes	Any processor running under CICS or VM	$30,000-$200,000
Concurrent Computer Corp. (800) 631-2154	**Reliance Plus**	**OS-32**	**Relational**	**RQL**	**Yes**	**Field level**	**Yes**	**Performance monitoring, asynchronous index restructuring**	**Yes**	**NA**	**$3,000-$24,000**
Cullinet Software, Inc. (617) 329-1134	IDMS/SQL	VMS	Relational	SQL	Yes	Data item level	Yes	On-line backup, log-level utilities, logical names creation	No	IDMS/R	$5,000-$110,000
	IDMS/R	MVS/XA, DOS/VSE/SP, VM/CMS	Relational	On-line query, supports forms or SQL syntax	Yes	Record level	Yes	Off-load/restore, roll forward/roll back, performance monitor	Yes	VSAM, Total, DL/1	$67,000-$235,000
Data General Corp. (800) 328-2436	**Infos II**	**AOS/VS**	**Hierarchical**	**Present**	**Yes**	**Access control by user**	**No**	**Interactive data manipulation, incremental dump and load, data base recovery facility**	**No**	**Flat files, DG/DBMS, DG/SQL**	**$715-$3,420**
	DG/SQL	AOS/VS	Relational	SQL, Present	Yes	Data item level and/or value level	Yes	Interactive data definition and manipulation, data base administration and performance monitoring utility	No	Flat files, INFOS II, DG/DBMS	Contact vendor
	DG/DBMS	AOS/VS	Codasyl	Present	Yes	Data item level	Yes	Interactive data definition and manipulation, integrity verification, statistic reporting	No	Flat files, INFOS II, DG/SQL	Contact vendor
Digital Equipment Corp. Contact local DEC sales office	RDB, VAX/VMS	VAX/VMS	Relational	Proprietary	Yes	Record level	Yes	Data manipulation, data maintenance commands	Optional	With optional features only	$3,540-$56,050
	VAX DBMS	VAX/VMS	Codasyl	Proprietary	Yes	Record level	Yes	Performance monitoring of statistics, dump facility	Optional	None	$5,460-$86,450

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

COMPANY	PRODUCT NAME	OPERATING SYSTEM(S)	TYPE OF APPROACH	QUERY LANGUAGE(S) USED	SUPPORTS CONCURRENT PROCESSING	ACCESS CONTROL TO WHAT LEVEL	INCLUDES A DATA DICTIONARY	DATA BASE ADMINISTRATOR UTILITIES PROVIDED	INCLUDES FACILITY FOR DOWNLOADING TO PCs	PERFORMS DATA TRANSFER WITH WHICH DBMSs	PRICE
Exact Systems & Programming Corp. (914) 265-8444	DNA-4	DG operating systems, RDOS, AOS, AOS/VS	Relational	Proprietary	Yes	Field level	Yes	File and record definition, display of data in data base as utility, development language	No	Infos	$1,250-$38,000
Financial Technologies International, Inc. (212) 912-6300	DB Aid for DBRC	MVS	NA	Proprietary	Yes	—	Yes	Reporting, time-stamp utilities	No	IMS	$15,000
Fulcrum Technologies, Inc. (613) 238-1761	Fulcrum Ful/Text	MVS, Unix, VAX/VMS, AOS/VS	Inverted file structure	None	Yes	Document level	No	Usage monitoring, document collection administration	Yes	NA	$5,000-$50,000
General Data Systems, Ltd. (215) 985-1780	GDX	Any IBM 3000 series, 4300 series and compatible mainframe operating systems	Relational	Proprietary	Yes	Field level	Yes	Full portability, performance monitoring and audit reporting, data dictionary cross-reference	Yes	IMS, VSAM	$20,000-$150,000
Gentry, Inc. (415) 547-6134	PAL	MPE, any operating system running on the HP 3000	Relational	Proprietary	Yes	Beyond field level	Yes	—	Yes	Masman	$7,700
Harris Corp. (800) 442-7747	Unify	Unix	Relational	SQL	Yes	Data item level	Yes	User security, backup and transaction logging utilities, menu management	Yes	Any DBMS supporting SQL and flat file import utility	Contact vendor
	Oracle 5.0	Unix	Relational	SQL	Yes	Data item level	Yes	Oracle display system, auditing facility, data loader, after-image journaling	Yes (Version 5.1)	NA	Contact vendor
Henco Software, Inc. (617) 890-8670	Info-DB Plus	VAX/VMS	Relational	Proprietary	Yes	Data item level	Yes	Screen-based data dictionary, security, user profile editors, traditional DBMS with unstructured text fields	No	Native file structures	Contact vendor
Hewlett-Packard Co. Contact local HP office	Turbo Image	MPE, MPE XL	Network DBMS	Query language	Yes	Data item level	No	Creates data bases and erases them, shows users of data base, restructuring	Yes	NA	Contact vendor
	HP SQL	HP-UX, MPE, MPE XL	Relational	ISQL	Yes	Data item level	Yes	SQL Util	No	NA	$4,000-$15,000
	Allbase	HP-UX, MPE, MPE UL	Relational, network	ISQL, IQuery	Yes	Data item level	Yes	Data base creation	No	NA	$20,000-$30,000
Honeywell Bull, Inc. (800) 328-5111 ext. 90	Multics Relational Data Store	Multics	Relational	Proprietary	Yes	Table level	No	Restructuring capabilities, decentralized administration	No	None	Contact vendor
	IDS/2	GECOS	Codasyl	SQL, QRP/PLP	Yes	Physical record level	Yes	Save and restore, analysis utilities, restructuring and reorganization	Yes	I-D-S/2 in a mainframe environment	Contact vendor
	Interel	GECOS 8 for Interel	Relational	SQL	Yes	Any level	Yes	Load facilities, optimization utilities, access of nonrelational data with SQL	Yes	None	$8,000-$14,000
IBM Contact local IBM sales office	DB2	MVS/370, MVS/XA, MVS/TSO	Relational	SQL	Yes	—	Yes	Recovery backup, on-line Help facilities, performance monitor	—	IMS, VSAM	Contact vendor
	IMS/VS-DB	MVS/370, MVS/XA	Hierarchical	DL/1	Yes	Field level	Yes	Backup, recovery and reorganization utilities	—	VSAM, DB2	Contact vendor
Information Builders, Inc. (210) 736-4433	Focus	VM, MVS, VAX/VMS, Unix, Wang VS	Shared relational	Proprietary	Yes	Record level	Yes	Report generator, dialogue manager, application development system	Yes	IMS, DB2, SQL/DS	$43,000-$100,000
Information Dimensions, Inc. (800) 328-2648	DM	VAX/VMS, Control Data NOS/VE	Relational	Proprietary	Yes	—	Yes	Report writer, language-independent interface, Cobol and Fortran interface	No	—	$25,000-$43,500
Information Structures, Inc. (303) 393-3911	Base/OE	VAX/VMS, RSX	Hierarchical	Proprietary	Yes	Field level	No	—	No	None	Contact vendor
Informix Software, Inc. (415) 322-4100	Informix SQL	VMS, DOS, all Unix versions	Relational	SQL	Yes	Field level	Yes	Report writer, screen generator, interactive schema editor	Yes	Lotus's 1-2-3	Contact vendor
	Informix 4GL	VMS, DOS, all Unix versions	Relational	SQL	Yes	Field level	Yes	Report writer, screen generator, interactive schema editor	Optional	None	Contact vendor
Intelligent Information Systems, Inc. (212) 906-4488	IIS/Destiny	VAX/VMS	Hierarchical, relational, network	Form-driven	Yes	Field level	Yes	Loader, dictionary report, automatic generation of file-maintenance utilities	No	Any RMS file	$15,000-$50,000
Interbase Software Corp. (617) 649-3977	Interbase	VAX/VMS, VAX-/Ultrix	Relational, distributed	SQL, proprietary	Yes	Field, view levels	Yes	Backup utility, data base maintenance utility	Yes	RDB/VMS	$15,000-$75,000
International Parallel Machines (617) 890-2977	IPDBMS	IPOS (proprietary)	Relational	Proprietary	Yes	Field level	No	Data base library	Yes	ISIS, Ingres	Contact vendor
MAI Basic Four, Inc. (714) 731-5100	MAI Origin	BOSS/IX, BOSS/VS	Relational	Query-by-Example	Yes	User-level security	Yes	Data item where used, file-/program cross-reference, data impact report	Yes	Any vu flat file	$995-$10,900
Microforms Trans-Lingual (612) 944-5951	Dcare	VMS, MVS/CICS, VM/CMS, MVS XA, CICS	Relational	Proprietary	Yes	—	Yes	—	Yes	Any DBMS through sequential file listing	$15,000
Must Software International (203) 762-2511	Nomad 2	VM/CMS, MVS/TSO	Relational, hierarchical	Proprietary	Yes	Field level	Yes	Function to build data dictionary, data base check for fragmentation statistics	Yes	IMS, DB2, SQL/DS, IDMS	$45,000-$120,000
National Information Systems, Inc. (408) 257-7700	Accent R	TOPS-10, TOPS-20, VMS	Relational	Proprietary	Yes	Any level	Yes	Performance monitoring, host-language interface	Optional	Through host-language interface only	$4,000-$99,000
Officesmiths, Inc. (613) 235-6748	The Officesmith	Unix	Hierarchical	Proprietary	Yes	Field level	Yes	Report generator, screen generator, 4GL	No	Unify	$5,000-$90,000

COMPANY	PRODUCT NAME	OPERATING SYSTEM(S)	TYPE OF APPROACH	QUERY LANGUAGE(S) USED	SUPPORTS CONCURRENT PROCESSING	ACCESS CONTROL TO WHAT LEVEL	INCLUDES A DATA DICTIONARY	DATA BASE ADMINISTRATOR UTILITIES PROVIDED	INCLUDES FACILITY FOR DOWNLOADING TO PCs	PERFORMS DATA TRANSFER WITH WHICH DBMSs	PRICE
On-Line Software International, Inc. (800) 538-0372	**Ramis Information Systems**	**DOS/VSE, MVS/XA, VM/CMS**	**Relational**	**SQL/DS**	**Yes**	**File level**	**Yes**	**Utilities program included**	**Yes**	**DB2, DL/1, IMS/VS, SQL/PS, Adabas, IDMS/R, Total**	**$49,000-$115,000**
Oracle Corp. (800) 345-DBMS	Oracle	VM/CMS, MVS, VAX/VMS, VAX/Ultrix, Unix System V, 4.2	Relational	SQL, SQLForms, Query-by-Example	Yes	Data field level	Yes	SQLLoader for file conversion, SQLForms 4GL application generator, SQLConnect for interfacing to DB2	Yes	DB2, SQL/DS	Contact vendor
Prime Computer, Inc. (617) 655-8000	**Prime Information**	**Primos**	**Distributed relational**	**English structure for 4GL**	**Yes**	**Subvalue level**	**Yes**	**System tuning, security, backup ability**	**Yes**	—	**$5,000-$35,000**
	Prime Oracle	**Primos**	**Relational**	**SQL**	**Yes**	**Value level**	**Yes**	**Import/export for table backup and recovery, ODL for converting flat ASCII files in Prime Oracle tables, performance tuning capabilities; multitable clustering, indexing**	**Yes**	**DB2, SQL/DS**	**$10,000-$80,000**
Public Office Corp. (202) 638-5999	Session	VAX/VMS	Proprietary	Proprietary	Yes	Data value level	Yes	Reorganization of data, evaluates data from foreign systems, reads any fixed-length tape, includes any data base	Yes	Any	$8,200-$50,000
Quodata Corp. (203) 729-8777	**QDMS-R**	**VAX/VMS**	**Relational**	**Proprietary**	**Yes**	**Bit level**	**Yes**	**Report generator, screen-based administrative views**	**Yes**	**Powerhouse, RDB, DBMS/32**	**From $12,000**
Relational Technology, Inc. (800) 4-INGRES	Ingres	Most Unix versions, MS-DOS, VM/CMS, AIX, PC-DOS, VAX/VMS, Ultrix	Relational	SQL, QUEL	Yes	Field, time, data, user levels	Yes	Cojournaling/recovery/audit facilities, query cost, query plans, settable maximum cost query allowable, user-settable concurrency-control mechanisms	Yes	DB2, SQL/VS, RDB, IMS, RMS, Dbase III, Lotus's 1-2-3	$5,000-$140,000
Rhodnius, Inc. (416) 922-1743	**Empress 32**	**VAX/VMS, Unix**	**Relational**	**SQL**	**Yes**	**Field level**	**Yes**	**Automatic data conversion, integration with non-database data**	**Yes**	**ASCII, fixed links, delimited files**	**$9,000-$100,000**
Ruf Corp. (913) 782-8544	IMPRS	VAX/VMS, RSTS	Relational	Proprietary	Yes	Record level	No	—	No	—	$10,000-$20,000
SAS Institute, Inc. (919) 467-8000	**Data Management Software**	**OS, CMS, DOS/VSE, NOS, OS-1100**	**Hierarchical**	**Proprietary**	**Yes**	**Field level**	**Yes**	**Accounting log, rollback and recover, report writing**	**Yes**	**DB2, IMS**	**From $12,000**
Saturn Systems, Inc. (800) 328-6145	Saturn-Base	VMS, RSX, TSX, POS, RSTS	Relational	Proprietary	Yes	File level	No	Rekeying, data file extension, password modification	No	Any with ASCII files	$1,850-$14,000
Seed Software Corp. (800) 445-3367	**Seed DBMS, Prompt**	**VAX/VMS, VM/CMS, OS/2, PC-DOS, MS-DOS, Primos**	**Codasyl**	**Prosseed, DBQuery**	**Yes**	**Item level**	**Under development**	**Statistics on usage, optimization tool, readable data page dump with all pointers, broken-pointer search, broken-pointer repair**	**Yes**	**None**	**From $995-$78,950**
Signal Technology, Inc. (800) 235-5787	Omnibase	VAX/VMS	Relational	SQL	Yes	Field level	No	NA	No	Britton Lee data bases	$5,000-$55,000
	Smartstar	VAX/VMS, MicroVMS	Relational	SQL	Yes	Field level	No	VAX/RDB	No	Datatrieve, VAX 3GL languages, Oracle, Ingres, VAX RMS programs	$3,500-$5,000
Software AG of North America, Inc. (703) 860-5050	**Adabas**	**All IBM OS, VAX/VMS, Siemens OS**	**Relational**	**Natural, all 3GL access through SQL-based syntax**	**Yes**	**File, field, value within field levels**	**Yes**	**All functions incorporated into base product**	**Optional**	**Any**	**Contact vendor**
Sun Microsystems, Inc. (415) 960-1300	Sun Ingres	Sun version of Unix 4.2	Relational, network	SQL	Yes	Data item level	Yes	Report writer, transaction logging	Yes	None	$2,000-$3,000
	Sun Ingres	Sun version of Unix 4.2	Relational	SQL, QUEL	Yes	Data item level	Yes	Report writer, transaction logging, custom forms	Yes	Unify, Ingres through batch conversion	$2,500-$4,000
Sybase, Inc. (415) 548-4500	**Sybase System A**	**Sun Unix, VAX/VMS, VAX/Ultrix**	**Relational**	**SQL, proprietary**	**Yes**	**Any level**	**Yes**	**Data base consistency checker, dump and load, bulk copy**	**No**	**None**	**$10,000-$100,000**
Tandem Computers, Inc. (408) 725-6000	Nonstop SQL	Guardian 90	Relational	SQL	Yes	Value via SQL views	Yes	File utility programs, disk space analysis/disk space compression, backup/restore	Yes	Informix	$3,000-$4,000
The Ultimate Corp. (800) 654-0134	**Ultimate Operating System**	**Ultimate, Pick enhanced**	**Relational**	**Proprietary**	**Yes**	**Value level**	**Yes**	**Restart, recovery, backup, full application development system**	**Yes**	**Any Pick system, RMS**	**Contact vendor**
Unify Corp. (816) 920-9092	Unify	Unix, MS-DOS, Network-DOS	Relational	SQL	Yes	Field level	Yes	Complete set	Yes	Optional	$795-$50,000
Unisys, Inc. (303) 443-7878	C-Scribe	Unix	Relational	SQL	Yes	File level	Yes	All	No	HP Image	$15,000
Unisys Corp. (215) 542-6911	Universal Data Management System	OS-1100	Combines flat file, Codasyl, relational	SQL	Yes	Field level	Yes	Statistics gathering, recovery, debugging and audit trail	Optional	None	$89,000-$243,730
Userware International, Inc. (619) 745-6006	User-11	RSTS/E	Hierarchical	Proprietary	Yes	Block level	Yes	—	No	User Base	$7,500-$15,000
	Userbase	VAX/VMS	Hierarchical	Proprietary	Yes	Block level	Yes	—	No	Any RMS-based file	$7,500-$60,000
Wang Laboratories, Inc. (617) 459-5000	Pace	VS	Relational	SQL, Query-by-Example for Pace Query	Yes	View level	Yes	Recovery and backup, cross-reference reports, copy tables	Yes	IDMS/R	$13,000-$39,000
Westmoreland Software International, Inc. (305) 360-5858	Add System	IBM 5360, System/36 PC, System/34	—	—	—	—	Yes	Performance monitoring, report generator	Yes	—	$3,600
Zanthe Information/Unispress Software (201) 985-8000	ZIM	Unix, Xenix, Ultrix, VMS, MS-DOS, PC-DOS, Novell, QNX	Entity relational	Proprietary, SQL	Yes	Field level	Yes	—	Yes	None	$795-$25,000



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 20 MALVERN PA

POSTAGE WILL BE PAID BY ADDRESSEE

Sorbus®
A Bell Atlantic Company
50 E. Swedesford Road
Frazer, PA 19355-9976

Nothing scares Sorbus® people.

Whatever it takes to exorcise your system's demons, you can count on Sorbus. After all, we have the best-trained field sales force anywhere, with an average 20,000 class days every year. (Which makes our people anything *but* average.)

And we support them with a 230,000 part-number inventory—including more than 6.2 million individual parts, at last count. And we stock them nationwide, so the part you need is usually nearby. Our elaborate parts testing program assures performance, too.

No wonder our people are fearless.

Our customers are, too. In fact, a recent survey by *Data Communications* rated us the "Best Service Organization." And we've come out on top in *Datamation* and *Computer Decisions* surveys, too–for eleven and eight consecutive years, respectively.

Don't get scared. Get Sorbus. Call today. **1-800-FOR-INFO.**

Sorbus®
A Bell Atlantic™ Company

50 E. Swedesford Road
Frazer, PA 19355

With only one copy of Computerworld per department, security is extremely tight.

The more valuable a publication, the more important it is to have your own copy.

That's why we're offering you your own subscription to COMPUTERWORLD for just 76¢ an issue.

A week's worth of news for 76¢.

That's right. For just 76¢ an issue, you can find out what you need to know. When you need to know it.

You'll see what products breakthrough. And what products break down. You'll get the news and views of the industry. And the ads and advice of its leaders.

In fact, with COMPUTERWORLD on top of your desk, you'll be on top of your job.

And there's more...

In addition to your 51 issues of COMPUTERWORLD, you'll get – absolutely FREE...

- 12 issues of COMPUTERWORLD FOCUS – an in-depth exploration of a single critical topic each month: communications, data security, PCs, Information Centers...
- Our special Spotlight section twice a month. Head-to-head product comparisons with an at-a-glance ratings chart. Security products, LANs, graphics workstations,...a different product in each issue.

Call today. And stop waiting in line.

1-800-255-6286
(in NJ call 1-800-322-6286)

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Tandon exec passes posts to founder

BY JAMES A. MARTIN
CW STAFF

CHATSWORTH, Calif. — Tandon Corp. President and Chief Operating Officer Dan H. Wilkie has resigned that position, relinquishing both titles to S. L. "Jugi" Tandon, the company's founder, chairman and chief executive officer.

Wilkie, who has served as Tandon's president and chief operating officer since December 1985, will remain with the company to oversee its possible spin-off of a third-party service firm. Although plans are incomplete, Wilkie said discussions are ongoing with Tandon's board regarding his appointment as president and chief executive officer of the company's service organization.

"Tandon has wanted to have a more active role, and I've wanted to have more autonomy," Wilkie said. "A pet project of mine has been the customer service area, which I've been wanting to expand to serve non-Tandon products. We decided we would both be better off this way."

Wilkie, a longtime IBM executive before joining Tandon, brushed aside contentions that he resigned because of disputes with top management. "Anytime there'a a company with such complexity, there are always differences of opinion," Wilkie explained. "My relationship with Tandon is amiable."

Several analysts expressed surprise at the announcement. "Tandon has just gone through a period of financial difficulty, with their recent quarters showing improvement, so it was a surprise to see Wilkie step aside," said Ray Freeman Jr., president of Santa Barbara, Calif.-based Freeman Associates, a consulting firm.

CEO leaves redone Tigera

BELMONT, Calif. — Former Fortune Systems, Inc. Chairman James S. Campbell resigned last week as chairman, president and chief executive officer of Tigera Group, Inc., the renamed parent company of Fortune Systems' software business.

Campbell had helped orchestrate the recent sale of Fortune's ailing supermicro hardware business to SCI Systems Corp. in Huntsville, Ala. In a statement, Campbell said the completion of that sale allowed him to become a principal in Management Partners International, Inc.

Named to replace Campbell as chairman of Tigera Group was Isaac Gilinski, president of Industries Gilinski, a diversified manufacturer in Cali, Colombia. Susan Espy will continue as president of Tigera Corp., the company's software unit.

In financial results that partially reflected charges from its restructuring, Tigera Group reported a loss of $12.9 million on revenue of $1.3 million for the quarter ended June 30.

Parts tariff

CONTINUED FROM PAGE 71

result of the U.S.-Japan dispute over semiconductor trade [CW, April 27].

"Our member companies are deeply concerned about the ruling because it runs afoul of the 100% tariff," said Charlotte LeGates, a spokeswoman for the Computer and Business Equipment Manufacturers Association (CBEMA), which is based here.

Asked for reprieve

In a July 28 letter to the Customs Service, CBEMA called for a 60-day suspension of the ruling to give the industry time to rebut it. Also, the trade group is urgently seeking an interview with William von Raab, commissioner of the Customs Service, LeGates said.

According to CBEMA officials the ruling, made without a public hearing, is contrary to the long-standing experience of the computer industry and contrary to the letter and spirit of the 1985 trade agreement.

"It creates new, unfounded and unnecessary administrative criteria for determining the tariff status of hundreds of thousands of computer parts," CBEMA's letter to customs added.

The decision

The Customs Service ruling was issued by John T. Roth, the agency's director of classification, who argued that a circuit board capable of performing data processing and arithmetical computations is a data processing machine and, therefore, subject to tariff.

The industry generally refers to the boards as "single-board computers," he said, thereby confirming that they are computers rather than parts.

Roth'a legal ruling asserted that even though CPU boards must be plugged into a computer system in order to function, they are distinct commercial products that are ultimately capable of being programmed and executing programs, thus fitting the definition of data processing machines.

Expansion boards and boards used to control peripherals are properly classified as parts, the ruling said.

Rumor mill

CONTINUED FROM PAGE 71

hunt of bad news.

One of those hints, at least for many vendors of microcomputer peripherals, was the IBM Personal System/2. Its potential to rearrange that market niche created a volatile situation that many investors would rather not risk.

In general, the market seems ready to beat down the price of an otherwise solid computer company at the first glitch in growth rates. Two cases in point are Cray Research, Inc. and Alliant Computer Systems Corp. — firms with well-regarded management teams and impressive technology that seem well positioned for the long haul.

But both firms recently announced slower quarters than expected. Now Alliant's stock is hovering in the high teens after peaking at 37; Cray is near 100 after rising higher than 135.

Another factor affecting investors is the torrid pace of mergers and acquisitions in the industry this year. The Broadview Associates index of software and services industry deals is up again for the first six months of the year: 137 deals for $2.1 billion, compared with 130 deals for $1.9 billion in the first half of 1986.

A wave of industry marriages invariably produces an even bigger wave of takeover rumors — thus the laughable phenomenon of CDC's stock rising on such a rumor. This rumor will undoubtedly take its place in the Non-News Hall of Fame, along with AT&T buying Wang Laboratories, Inc., AT&T buying Digital Equipment Corp., Ford Motor Co. and NCR Corp. buying Sperry Corp. and, most recently, Prime Computer, Inc. buying Data General Corp.

In reporting the plunge in NEC's stock last week, one national newspaper wrote, "One trader said that a rumor sometimes has much greater impact on a stock than fact." That line speaks volumes about trying to gauge a company's prospects as a vendor on what happens to its shares in the stock market.

Wilder is *Computerworld's* senior editor, computer industry.

TRW service

CONTINUED FROM PAGE 71

"We want customers to recognize us as an extension of their company."

TRW's Customer Service Division is running neck and neck with Sorbus for leadership in the $1.6 billion third-party computer maintenance business. The division is faced not only with a recommitted IBM but with competition from other hardware manufacturers, such as Digital Equipment Corp., which are expanding their maintenance activity. Both the TRW division and Sorbus claim revenues of around $220 million. Sorbus, however, formerly owned by now-defunct Management Assistance, Inc., counts revenue from servicing computers of ex-sister company MAI Basic Four, Inc. as third-party revenue, which has added considerably to its market position.

No longer 'top banana'

"TRW was always the top banana in the third-party maintenance business over the last couple of years, but now they are sharing the limelight with Sorbus," says D. R. "Mike" MacNaughton, president of Business Development International, a Franklin Lakes, N.J., consulting firm that tracks the business.

TRW's plan to diversify into application and operating software maintenance and consulting services should help it fend off the competition, analysts say.

"Generally, the issue is not just being in the hardware maintenance business,

TRW's Snyder

but being able to implement different services," notes Rebecca Segal, an analyst with International Data Corp. "Software support, communications and training are segments that will help grow the business."

Snyder says he is on the prowl for acquisitions that would complement the firm's current business activities. The division is evaluating companies that maintain equipment in the financial services, retailing, resellers, government and medical markets. Through a mix of internal growth and acquisitions, Snyder says he hopes to double the division's revenue during the next three years.

The resources necessary to do these things and more are plentiful at a $6.5 billion conglomerate, Snyder says. TRW recently designated its Information Systems Group as one of the profit centers in which it will invest heavily. Snyder says increasing the technical expertise of his field engineers is among his highest priorities. To accomplish this, the division plans to offer a better training program and incentives to personnel.

Reach potential customers just as they're ready to buy.

In SPOTLIGHT, the buyer's guide to the computer world.

Inside *Computerworld* these days, you'll find SPOTLIGHT. Each one a special "buyer's guide" covering features, prices and specs for every major offering in a given product category.

For our readers, SPOTLIGHT provides a unique feature-by-feature tabulated product comparison in a handy pullout section. A section they'll save for quick reference when they're ready to buy. Plus editorial covering technology trends, user reports and broad category overviews.

For our advertisers, it provides an opportunity to strike while the iron is hot. And reinforce sales messages at precisely the right moment. Just as buying decisions are being made.

So reserve your space in SPOTLIGHT now. And get your message across when it will do the most good. When the buyers are buying.

For more information, contact Ed Marecki, Vice President/Sales at (617) 879-0700, or call your local *Computerworld* sales representative.

COMPUTERWORLD
An IDG Communications Publication

Upcoming SPOTLIGHT Issues

Issue	Topic	Ad Closing Date
Aug 31	DBMS for Micros & Small Systems	Aug 14
Sept 14	DB2 Market	Aug 28
Sept. 21	Hardware Roundup Large & Medium Scale Systems	Sept 4
Sept. 28	Hardware Roundup Small Scale Systems	Sept. 11
Oct 5	Hardware Roundup: Micros	Sept. 18
Oct. 12	Leasing & Used Equipment	Sept 25
Oct. 19	Capacity Planning/ Performance Monitoring Software	Oct 2
Oct. 26	Unix	Oct. 9

Sales Offices:
Boston: (617) 879-0700 **New York:** (201) 967-1350 **Washington D.C.:** (703) 280-2027 **Atlanta:** (404) 394-0758
Chicago: (312) 827-4433 **Dallas:** (214) 233-0882 **Los Angeles:** (714) 261-1230 **San Francisco:** (415) 421-7330

GET MORE FOCUS IN YOUR ADVERTISING.

Computerworld Focus has always been one of the smartest buys around. Because it lets you maximize the impact of your advertising by surrounding your message with timely editorial that's relevant to your company's product or service. In the coming year, you'll be able to target your message in issues devoted to topics like communications, personal computers, operating systems, applications software and more.

So put more Focus into your advertising for 1987. And reach the $120 billion market consisting of more than 128,000 paid *Computerworld* subscribers, plus thousands more in pass-along readership and bonus distribution at major national shows.

So don't shotgun your advertising budget when targeting your audience is so simple.

All you have to do is get your message in Focus.

Computerworld Focus Topic	Issue Date	Closing Date*	Show Distribution
Information Centers**	October 7	September 4	
PC's	November 4	October 2	Comdex/Fall
Software	December 2	October 30	Dexpo West

*Premium positions close one week prior to the published closing date above
**Starch Ad Study Issues

For more information, contact Ed Marecki, Vice President/Sales, *Computerworld Focus*, 375 Cochituate Rd., Box 9171, Framingham, MA 01701-9171 (617) 879-0700. Or contact your local *Computerworld* sales representative.

COMPUTERWORLD

FOCUS

An IDG Communications Publication

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700 **NEW YORK:** Paramus Plaza, I, 140 Route 17 North, Suite 312, Paramus, NJ 07652, (201) 967-1350 **WASHINGTON, D.C.:** 3022 Javier Rd . #210, Fairfax, VA 22031, (703) 280-2027 **CHICAGO:** 2600 South River Road, Suite 304, Des Plaines, IL 60018, (312) 827-4433 **ATLANTA:** 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319, (404) 394-0758 **DALLAS:** 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882 **LOS ANGELES:** 18004 Sky Park Circle, Suite 255, Irvine, CA 92714, (714) 261-1230 **SAN FRANCISCO:** 300 Broadway, Suite 20, San Francisco, CA 94133, (415) 421-7330

EMPLOYMENT TODAY

Making the switch to sales

Vendors seek technology know-how for marketing positions

BY STEPHEN BANKER
SPECIAL TO CW

After pursuing an early career in data processing and assembly language programming, Peter Green switched from the technical to the "people" side of the business three years ago when he joined General Electric Consulting Services. Today, at 39, he is marketing and sales manager for the Northeast area, working out of Albany, N.Y.

"I was a machine person, and I said to myself, 'I can have more fun being a people person,'" Green says. That simple statement explains why Green and many DP people like him are jumping from technical positions to sales and marketing.

As computer products become increasingly complex in an era of rapidly changing technology, they are, inevitably, more difficult to explain. In some instances, computer companies are finding that the most effective people to showcase their products — and to differentiate them from those of the competition — are the people who have worked on the original design and implementation.

Superior financial rewards on the sales side are part of the reason for the trend, according to those making the switch. One DP worker who is considering the change says, "Here I am making $40,000 a year, killing myself, helping the salesman make $80,000. Hey, I know as much as him. In fact, I do all his work for him. Why don't I make that kind of money?"

"If I were still in the DP shop," says another worker, who has already made the transition, "my day would be 8 a.m. to 5 p.m., earning 30% to 40% less, and [I would be] underchallenged. Now, I like my job enough so that it's almost like a compulsion, and I frequently work from 6 a.m. to 10 p.m."

Not everybody fits

But the move is not right for everyone. The marketing job requires considerable desire. Despite his overall increase in income and job satisfaction, the individual who changed positions has actually taken a cut in his hourly rate.

"The technical people who move into sales are very customer-oriented to begin with," says Dennis Jolly, director of sales for PC's Limited in Austin, Texas. "There are people who are in technical jobs who are happy where they are and would not be happy in sales, because sales requires some specific personality traits."

What are those traits? "Salesmen are very competitive people," says Harvey Silver of Dunhill Personnel Consultants in Tysons Corner, Va. "Every sale is a conquest. A person finds himself with his ego exposed to the whim of the buyer."

Silver suggests that the government marketplace, compared with the private sector, offers a smoother transition for DP workers and other technically oriented personnel who want to go into sales and marketing.

> "IN THE commercial world, the image of a salesman is different. Even your car has to be nice, in case you have to take a client out to lunch. A technical sort might not have that pin-striped kind of appearance."
>
> HARVEY SILVER
> DUNHILL PERSONNEL CONSULTANTS

"In the commercial world, the image of a salesman is different," Silver says. "Even your car has to be nice, in case you have to take a client out to lunch. A technical sort might not have that pin-striped kind of appearance. The government market doesn't demand the classic starched shirt. In government sales, you get down there in the trenches. It's a more proposal-oriented."

Tarnish to the glitter

But personal style is not the only obstacle to the transition. "You're going from salary," Silver says, "to a situation in which compensation is based on production. You have the risk of rejection and a series of highs and lows. All of a sudden, that money becomes less glittery."

There is clearly a price to be paid for the extra earnings in terms of hours, aggravation and responsibility. Sales jobs in the computer industry are likely to take a worker away from home a few days every week.

Even the money is deceptive. A typical DP worker, earning perhaps $40,000 a year, is likely, at first, to be kicked down to $30,000 with the prospect of commissions. But before the commissions start coming in, mortgages and other bills remain due every month. The bottom line is that turnover among sales agents is consistently higher than among technical people.

Manny Fernandez, president of Dataquest, Inc. in San Jose, Calif., draws a distinction between types of computer companies. "The best utilization of technical personnel," he says, "is when the marketing of the product is highly technical.

"Take the companies with the newest 32-bit machines, microprocessors and peripherals," Fernandez explains, "that's when a product tasks the computer beyond its normal applications, and you have to become highly involved in the architecture of the machine. You need a design-level understanding to be able to talk to the customer. Then, the chances are that someone from the engineering organization will make a heck of a lot more sense, taking it down to the device level."

On the other hand, Fernandez adds, there is the situation of "a company selling DP equipment into a DP shop to do the same things they have done in the past; there's no necessity for a technical person to be involved in the sale."

The consensus is that for those seeking to make a move, the best place is one's current job. As Silver says, "If the guy knows the product well, they'll give him a shot because he's bugging them to death. The companies aren't going to pay me large dollars to get them people who've had no experience."

Banker is a Washington, D.C.-based writer.

Senior Database Administrator

Create New Systems Using Relational Databases (DB 2)

As the world's pre-eminent direct mail marketer, our success is contingent on streamlined systems of the highest calibre. Right now, we have an opportunity for a Senior Database Administrator to implement a major DB 2 application and associated applications development tools.

You will be expected to have a high level of technical expertise augmented by a willingness and ability to play an active role in our applications design team. Ideally, you should have 5-8 years of data base design, installation and tuning expertise in IBM mainframes, including some experience with relational databases in a production environment. A Bachelor's degree and outstanding communications skills are required.

This highly visible position commands an excellent salary and full array of company benefits within our forward-moving environment.

For further information, please call Steve McDonald (215) 459-6258

or send resume, indicating salary history to: **Executive Recruiter, Dept. SDA C 81G, The Franklin Mint, Franklin Center, PA 19091.** Equal opportunity employer

FM

PROGRAMMER Jr. Level

CardioCare, a nationwide health care organization seeks a talented Jr. Programmer in this highly visible, "junior exec" position.

You'll learn and grow within our dynamic team of experts as you help program and maintain systems to suit the company's needs in our stimulating, technologically ahead environment.

To qualify, you must possess at least 2-3 years experience on HP 3000, along with good interpersonal skills to interface with user population. FORTRAN and/or COBOL knowledge is essential.

We offer an excellent starting salary (up to $27K) commensurate with experience plus the opportunity for advancement within. For prompt consideration, send your resume with salary history to:

Human Resources Department, 11th flr.

CardioCare
118-35 Queens Blvd.
Forest Hills, NY 11375
(No phone calls)

Equal Opportunity Employer

Medtronic CardioCare

Software Consultants

Immediate Assignments Boston Area

Minimum 2 years experience required

- **ADABAS/NATURAL** - Contractual & permanent positions
- **COBOL/CICS**
- **IDMS, CICS, COBOL**
- **Financial Applications Analyst** w/ any of the following: portfolio fund accounting, banking, securities, or mutual funds

Send your resume or call Joe Candito or Tom Schellenberg

ADEPT

ADEPT, Inc.
170 Worcester Road, Suite 5
Wellesley, MA 02181
(617) 239-1700

Member of NEACC

SOFTWARE SPECIALIST Design, test, develop and modify computer software systems, applications and user interfaces. Develop applications and/or systems software in "C" and the UNIX* operating system environment. Design applications utilizing database systems and computer graphics. Evaluate the UNIX operating system and design subsystems within the operating systems kernel and at the application level to enhance and extend the functionality of the system. Some projects are performed on client sites at various geographic locations. Minimum Requirements: M.S. in Computer Science. One year experience in the position offered or one year experience as a research or teaching assistant using the UNIX operating systems. One course in each of the following: Advanced Operating Systems, Real-time Operating Systems, Principles of Programming Languages, Computer Graphics and Database Design and Implementation. Must have completed one major project in operating systems internals. Must be willing to travel an average of 25% of time domestically. 40 hours per week, 9:00 a.m. to 5 p.m. $33,327 per year. Submit resume to: Illinois Department of Employment Security, 401 South State Street, 3 South, Chicago, IL 60605, Attention: Mrs. S. Chasen, Reference #6791-S. AN EMPLOYER PAID AD.

* UNIX is a registered trademark of AT&T

PROGRAMMER ANALYSTS

Permanent and/or Consultant Positions NY Metropolitan Area

UNISYS

- A Sr Data Communications Analyst w/5-7 yrs Data Communications exp. NDL, ALGOL, Telecommunications Hardware, ASYNC, BYSYNC
- Data Communications Proj Leader w/8-10 yrs overall exp. Telecommunications Hardware, writing & planning skills, able to interface w/mgmt

DEC

- Prog'r/Analyst Banking Background w/VAX, VMS, Basic, 3-5 yrs exp

IBM

- Experienced Progr/Analysts using FOCUS

Please call Dewey Raymond, 212-684-3050 or submit resume to: HANK WALSH ASSOCIATES 475 Fifth Ave, NY, NY 10017

WE'RE YOUR FUTURE

To achieve the most effective career growth you really do need the expertise of experienced career consultants who specialize, on a daily basis, in EDP placement. And you'll find that our people, at National Computer Associates, are among the very best. Also you need to know all about the great number of excellent opportunities, both locally and nationally, available to you...and it's unlikely that you'll find more elsewhere. The many specialized services and inside information we provide you is your assurance that your career moves will be the best for you.

Come in. Call. Or mail your resume to the NCA firm nearest to you.

National Computer Associates

Contracts

Trident, a major force in European contract staffing, is making it big in America. We have urgent requirements for the following with two+ years' experience.

	CONTRACT
ADA - URGENT! Programmers/Prog. Analysts/3 +yrs. exp./ Military Integrated Logistics/Configuration Mgmt. - Northeast	$3K or DC
"C" UNIX/Data Base/ASL SW/Eng - O'seas, 2 yrs. - Sweden	$G
Wang Financial Prog./Analysts - East & West	$H
VAX/Cobol Programmers - MS, & East	$H
Data Base Design - Ingres, Focus, Oracle or Rdb	$H
IBM Sys 38, RPG III Prog./Analysts/Trainers - West	$H
VAX "C" S/W Eng. w/Microsoft Windows Exp. - East	$H
UNISYS (Sperry) Mapper PR, DB Design - PA	$H
UNISYS (Burroughs) MCP Syst./Prog. - MS.	$H
UNISYS (Burroughs) Algol PR - Northeast	$H
HONEYWELL GCOS (GMAP Syst. Prog. - West Coast	$H
HONEYWELL Level 6 (GPS-6) Data Comms. - MS.	$H
IBM - Adabase/Natural PR - Various Loc.	DC
IBM - IDMS/ADS-O PR - Various Loc.	DC
IBM VM + UNIX/C Conversion Specialists - Midwest	DC
IBM IMS DB/DC - All Locations	DC

PERMANENTS

We are pleased to announce the initiation of our new permanent staffing division and have numerous requirements for the following:

Data Comm S/W Eng. - all Protocols - $30-$60K	$G
Syst. Engineers - IBM PS-2/UNIX/DPS6/COMPAQ - $30-$60K	$G
IBM RPG III/Syst. 38 Prog. & PA - $30-$35K	$H
Director of OA - $60A & Corporate Product Improvement Exp. - To $90K	$G
Graphics and Comp-Aided Publishing SW Eng. - $30-$50K	$G

Plus many more software & DP openings.

To apply, please send your resume to Trident Computer Services, 39 Boston Post Road, Marlborough, MA 01752 for the attention of the relevant contact above.

Or call (617) 460-0287.

TRIDENT COMPUTER SERVICES INC.

Get your money's worth. Computerworld will lower your cost-per-hire.

When you're looking to fill MIS/DP positions, there's really only one place you need to advertise. Computerworld.

In every major market, Computerworld reaches more data-processing professionals than the local recruitment media. And we reach them for less. Over 600,000 computer-involved professionals receive Computerworld every week. That's more than any other computer trade journal, business publication, or general-interest magazine.

Computerworld delivers quality readership, too. Fully 41% of our subscribers read Computerworld's recruitment section every week. And 95% of our subscribers read this section regularly. The openings they advertised for cover the whole gamut of MIS/DP positions – including systems analysts, computer science & software engineers, directors of MIS/DP, programmers, sales managers, and systems managers.

As a matter of fact, recruitment advertising has made Computerworld the national leader in classified advertising among specialized business publications (according to *Business Marketing* magazine). Compare costs and the people reached. You'll find that Computerworld is the number one medium for computer-related recruitment advertising.

COMPUTERWORLD
Classified Advertising
P.O. Box 9171
375 Cochituate Road
Framingham, MA 01701-9171

Data Processing

INFORMATION RESOURCE MANAGEMENT

We're looking for IRM professionals who want to expand their horizons by working in a very sophisticated Data Processing environment for one of California's most progressive high-tech companies.

Administration Manager

Direct and coordinate all IRM training and the capital asset budget, including overseeing of staff, facilities and system support, and program management. You will interface with other departments to verify training scheduling and attendance verification as well as provide program control for development analysis, design and computer programming support of departmental automation. Will also administer all departmental personnel reports and EEO/APP activities. BA/BS in Business Administration or equivalent required, with course work in human resource management and CS preferred. Must also have 3+ years management experience with a record of software development program management success.

Standards and Procedures Manager

Provide overall direction, development and publishing of IRM standards and procedures including documentation analysis, document preparation and distribution, records management and publication and presentation development. You will also supervise and direct technical writing and production staff.

Requires BS/BA in Communications or Administration with emphasis on business systems desirable. Experience in management and document security training, and well developed presentation and communication skills are preferred.

Please send your resume to:

Information Resource Management
Dept. 331 MSW
P.O. Box 76387
Los Angeles, CA 90076

U.S. Citizenship required. Equal Opportunity Employer M/F/H/V

SR. PROGRAMMER ANALYSTS

If you're an aggressive type individual who prefers taking charge to taking orders, then you need to consider Armour Pharmaceutical. We're a world leader in specialized scientific products and a unit of the Rorer Group, Inc. The possibilities and environment are now more dynamic then ever in our medium size shop as we pick up additional functions from corporate.

Positions involve new development and maintenance in support of MRP, purchasing, finance and a variety of other applications. Candidates should have at least 3-7 years of related experience with significant COBOL knowledge. A background in a manufacturing environment and with Unisys 'A' series hardware is preferred. Experience Unisys MCP, DMS II, GEMCOS/COMMS and on-line systems is also preferred.

Our 700 employee advanced manufacturing facility offers a fast-paced growth and non-smoking environment, plus attractive salaries and benefits, including relocation program. We're located within easy access to Chicago and less than 30 minutes from some of Chicago's finest suburbs. If you want to join an environment where you can contribute more, send resume with salary history and requirements in confidence to **John S. Deviantes/Manager, Personnel Administration, Dept. CW8-10.**

ARMOUR 100 YEARS

Armour Pharmaceutical Co.
PO Box 511, Kankakee, IL 60901
Equal Opportunity Employer
Armour hires only United States citizens and lawfully authorized alien workers.

System Developers 800-231-5920

Inviting resumes from individuals in the more highly technical computer related vocations such as: PhD Computer Scientist, Operating System Developers, Data Base Developers, Porting Specialists, Networks and Telecommunications, Architecture, Artificial Intelligence, Graphics Systems Developers, Microcodes and Firmware Developers, Compiler Developers, etc. Special interest in emerging technology such as neural architectures, UNIX, ADA, etc. Studies involved in scientific applications development including military, process control, data acquisition, telemetry and communications, CAD/CAM, simulation and modeling, etc.—we are a professional employment firm managed by graduate engineers. Fees are paid by the employer. All geographic locations. Send resume or call D.A. Fredericks and ask for our free resume workbook & career planner.

Scientific Placement, Inc.
P.O. Box 19849 CW Houston, TX 77224 713/493-0505
UNIX is a trademark of Bell Labs

"YOU CAN'T DO THAT"

Build a UNIX* operating system with the capabilities to handle mainframe power and the capacity to handle hundreds of mainframe users?

"IMPOSSIBLE!" most companies would say

But not Amdahl. As a leader in the development, manufacture, sales and support of general purpose and scientific computer systems, storage products, communications systems and software, we search for the finest quality talent in the field. We are currently seeking operating systems development professionals to join our UTS** development team in the following areas.

PERFORMANCE MEASUREMENT TOOLS DEVELOPERS

YOU CAN design, implement, test and maintain UTS** performance monitoring and measurement tools as well as developing capacity planning tools for Amdahl's 5890 mainframe. Duties will include analysis and measurement of system I/O activity and internal kernel data flow. Experience should include 5+ years' performance measurement and optimization of large systems. Knowledge of operating systems architectures and understanding of UNIX* and/or large systems also a plus. Position also available in performance certification. Experience should include 5+ years of performance evaluation, tuning, development, and execution of a benchmark.

UNIX* INTERNALS DEVELOPERS

YOU CAN design, implement, test and maintain portions of the UTS** base system for Amdahl's tightly-coupled multiprocessor system, the 5890. Additionally you will develop operating systems for future processors, participate in project architectural planning, analysis and enhancement. Experience should include 5+ years of UNIX* operating system development with an emphasis on kernel level development or modification.

MANAGER, UTS** LANGUAGES DEVELOPMENT

YOU CAN manage a group of 6-8 programmers responsible for the development of software generation systems for UTS** software products including C, FORTRAN and PASCAL. Must be well versed in compiler technology and interested in on-going advances in the languages area. Will participate in setting UTS** product direction. Requires 7+ years' experience in a software product development environment as technical contributor and 3+ years as manager or project leader. Excellent written and oral communication skills are essential.

YOU CAN enjoy the benefits and competitive salary you would expect from an industry leader. To apply, or for further information, call **BILL MCCARTHY at (800) 538-8460, extension 8843,** or send your resume to **Bill McCarthy, Amdahl Corporation, Employment Department, Dept. 8-5, P.O. Box 3470, M/S 300, Sunnyvale, CA 94088-3470.** Principals only please.

YOU CAN call on your PC or terminal 24 hours a day for job opportunities or to enter your resume. **Dial (612) 941-5723 and enter the password "AMDAHL".**

YOU CAN AT

amdahl

*UNIX is a registered trademark of AT&T **UTS is a trademark of Amdahl Corporation
Amdahl Corporation is proud to be an equal opportunity employer through affirmative action.

PROGRAMMER/ANALYST

Variety of long term contract positions available in Michigan and Alabama. Interviews for Alabama positions are being scheduled. Send resumes to Troy, Michigan. Substantial benefits and compensation package. Minimum 3 years experience. Minimum 1 year experience in any of the following: IMS DB/DC, CICS, DB2, COBOL. Send resume and/or call

C.E.S. Inc.
(Computer & Engineering Services)
6964 Crooks
Troy, MI 48098
(313) 828-3360
Attention DP Recruiter

CONSULTANTS/CONTRACTORS/PERMANENT

CW Systems Inc. has immediate openings if you have experience in the following areas:

ADABAS, IDMS, DB2/SQL, CICS, UNIX, IMS, DEC VAX 11/75, TELON

or application experience in GAS ACCOUNTING

Please call or write

CW Systems Inc.
300 West 5th Street
Suite 936
Austin, Texas 78701
512-469-0245

CW Systems Inc.
2925 Briarpark
Suite 830
Houston Texas 77042
713-781-7466

SOFTWARE SERVICES
The Industry Leader

A subsidiary of SYNTRON INTERNATIONAL INC

Paid relocation, excellent benefits and salary commensurate with experience

Florida

- COBOL, IMS DB/DC
- PL-1, IMS DB/DC
- FOCUS, VM/CMS
- DB-2, SQL, COBOL
- COBOL, PATHWAY, TAL, on TANDEM HARDWARE
- COBOL, CICS, DL-1
- IDMS, ADS/O
- RPG II or RPG III
- MODEL 204
- C/UNIX

Call toll-free National 1-800-237-8181 Florida only 1-800-282-4141

or send resume to Cy Dougherty, Personnel Director
Paragon Crossing, Suite 124, 11300 4th St. N., St. Petersburg, FL 33716

North Carolina

- DB-2
- COBOL, CICS
- ADABAS, NATURAL
- COBOL, IMS DB/DC

(704) 522-6321 or send resume to Bert Davis, Personnel Director
9101 Southern Pine Blvd., Suite 200, Charlotte, NC 28217

PHYSICIST/ELECTRICAL ENGINEER

The Bureau of Mines, Pittsburgh Research Center, has an immediate opening for an experienced individual in our computer group. This position, located in suburban Pittsburgh, will develop research laboratory automation systems, including the development of algorithms and methodologies, program development, integration of experimental equipment and sensors with local or remote computers, and recommend changes in experimental procedures when appropriate.

This position requires professional knowledge of the theories and principles of physics and a practical knowledge of digital electronics, instrumentations, computer interfacing, measurement techniques, communications, numerical and statistical analysis techniques, and fundamental principles of digital signal processing.

This is a Federal career opportunity in the U.S. Department of the Interior. Salary range $27,172 - $44,579. Interested applicants should forward resumes to be received by 08-25-87 to:

Bureau of Mines
Cochrans Mill Road
P.O. Box 18070
Pittsburgh, PA 15236
Attn: Personnel Officer, Dan Devney

An Equal Opportunity Employer

VACATION OR RELOCATION

When we place you in a permanent or consulting position we reward you with 1 week in London or the amount towards relocation your choice. We are part of a national network and have needs for (HIGH ACHIEVERS) in 12 southwestern/midwestern/California areas.

- IDMS/ADSO
- IMS DB/DC DB2
- CICS command/macro
- System 38/PA
- FOCUS/financial

ATM banking/develop

Forward resume and/or contact us at:

Computerstaff
3701 Birch St.
Newport Beach, CA 92660
(714) 756-3267

SYSTEMS ENGINEER

Responsible for research and development design and implementation in the areas of electronic control systems, test and measurement and computer vision. Use of Assembly C, BASIC and other appropriate languages. Analysis of original system requirements, upgrade system modifications, hardware/software tradeoff, performance and throughput. Customer interface and project scheduling/interfacing.

Requires BS degree in Electronic Engineering with two years work experience or MS degree in Electrical Engineering with no experience. Must have knowledge of electronic control systems, computer vision, IBM PC family and C, BASIC and Assembly languages. $2800/mo. Send resume and cover letter to Pacific Precision Laboratories, Inc., Dept. RP, 21018 Osborne St., Unit 4, Canoga Park, CA 91304. Not later than August 20, 1987.

Senior Staff Analyst - responsible for providing accurate systems sizing tools to field technical staff, to help size systems for proposals & assist w/customer capacity planning. Must analyze results of field analysis for systems sizing & performance modeling tools & techniques. Req's: BSCS or equiv. equivalent to BS + six yrs. relevant exp.; & four years exp. in systems programming & analysis to include a minimum of three years exp. in sizing large scale transaction processing computer systems; knowledge of & experience in the following computer languages, Prolog, Lisp, C, Pascal, FORTRAN, TAL, COBOL, Assembler, MUMPS, software systems, Guardian MSDOS, UNIX*, MVS, VM, communications protocols, SDLC including SNA/I, SNA, HDLC including X.25, X.400, BSC, ASYNC (polling & non-polling), fault-tolerant systems (internals): VTAM, RJE, miscellaneous systems, TMF, Measure, XRAY, Expand, PCDI. Must also have experience with micro computer tools, spreadsheets & database systems. 40 hrs./week. $48K/year. Job & interview site: Sunnyvale, CA. Send this ad & resume to Job #MLU-7530, P.O. Box 9580, Sacramento, CA 95823-0580 not later than August 24, 1987. EOE

UNIX* is a trademark of AT&T Bell Labs

COMPUTER ENGINEER. Design, test, develop, and modify computer hardware and software. Design computer networking systems and applications in "C" running under the UNIX* operating systems utilizing TCP/IP, ISO/OSI reference model and Ethernet. Analyze and report on performance measurement and reliability issues in computer networks. Analyze and debug real-time computer software for state-of-the-art microprocessor system. Languages required: "C", PASCAL, FORTRAN, UNIX-SHELL Programming Language Assembler. Some projects are performed at client sites in various geographic locations. Minimum Requirements: M.S. in Electrical Engineering or Computer Science. Six months experience in the position offered or six months experience as a research project assistant (experience must have included real time programming). One course in each of the following: Computer networking, operating systems, computer architecture, digital microprocessor. Must have completed one major project in each of the following: computer networking, operating systems running under UNIX, state-of-the-art microprocessor. Must be willing to travel 25% of time domestically. 40 hours per week, 9:00 a.m. to 5 p.m. $33,327 per year. Submit resume for Illinois Department of Employment Security, 401 South State Street, 3 South, Chicago, IL 60605. Attention: Mrs. S. Chatam. References #9981-S. AN EMPLOYER PAID AD

* UNIX is a registered trademark of AT&T

VAX HARDWARE SOFTWARE ANALYST

Carolina Power & Light Company is a Southeastern leader in power generation and distribution, serving the rapidly growing Carolinas. Our extensive information management capabilities reflect our commitment to a strong data processing environment, resulting in a challenging professional setting.

As a VAX Hardware and Software Systems Analyst at CP&L, you will be working on an automated distribution research project, using state-of-the-art equipment: VAX 11/780, VAX 11/750 (3), MICROVAX 2 (5).

This position requires 3-5 years experience in the following: VAX/VMS, hardware configuration, VMS systems management, networking, and VAX clusters. A four-year Computer Science or Engineering degree is preferred.

We offer a competitive salary and comprehensive benefits. For confidential consideration, please send resume with salary requirements to: **Susie Brown, Recruitment Representative, Dept. CWB/10, CAROLINA POWER & LIGHT COMPANY, P.O. Box 1551, Raleigh, NC 27602.** An Equal Opportunity/Affirmative Action Employer

CP&L

Carolina Power & Light Company

Software Engineer-40 hrs/wk 8am - 5pm Salary $33,000/yr Reqs: Bachelor of Science in Computer Science or equivalent (40 or hrs Computer Science subjects), 2 yrs exp in the position or 2 yrs as a manager systems software development, 1 yr exp in use of NOTIS for library automation. Duties: assist licensees of the Northwestern Online Total Integrated System for library automation in order to define their hardware & software reqs & to create system tables required for the circulation, cataloguing, acquisitions, & public service functions; assist the licensees in solving their requirements subsequent to installation by modifying their programs & analyzing & correcting system failures; modify Customer Information Control System tables to accomplish the NOTIS application & user requirements for licensees; telepreocessing network: translate NOTIS system for current licensees in spanish speaking countries of Venezuela, Chile, & Columbia. Send resumes to Illinois Dept. of Employment Security, 401 South State St., 3 South, Chicago, IL 60605. Attn: Robert Felton. Ref # V-IL 7146 F. An Employer Paid Ad

The best EDP people in the Bay Area pass through our doorway

You can be one of them; for nearly 15 years the best companies have relied on CRC to find superior data processing professionals to meet their needs. To find out what we can do for you, call today or mail your resume to: Computer Resources Group, Inc., 345 Sacramento Street, San Francisco, CA 94111, (415) 398-3535, or 3000 Oliver Street, Suite D304, Santa Clara, CA 95054, (408) 727-3535.

The Computer Resources Group, Inc.

An Affiliate of National Computer Associates

TANDEM

Omni Resources is an EDP consulting firm and licensed employment agency. We have long-term consulting assignments and full-time employment opportunities available nationwide.

We seek individuals with experience on Tandem systems at all levels.

For immediate consideration, please send your resume to Rod Mueller - CW810

OMNI RESOURCES, INC.
155 E. Silver Spring, Suite 207
Milwaukee, Wisconsin 53217
(414) 332-5252
1-800-545-4141 Ext. 523

COMMUNICATION SOFTWARE ENGINEER

Must be able to design and develop sophisticated software for telephony switching applications and Digital Transmission equipment (PABX). Including use of CHILL and Intel 8086 Assembly languages. Equipment to be used includes IBM 3033 mainframe, IBM PC, INTEL MDS, INTEL ICE. Bachelor's degree in Electrical Engineering, Computer Science or related degree is required. Must have a minimum of one year experience in job offered. Advanced degree accepted in lieu of experience, but must have knowledge of telecommunications software applications. Forty hours per week, $35,000 per annum.

Send resumes to:

Job Service of Florida
105 E. Broward Boulevard
Ft. Lauderdale, FL 33301
Job Order #FL 5748327

PROGRAMMERS — NJ/Westch

JOBS NOW OPEN FOR PROGRAMMERS

w/exp 'C' applications or internals or system administrtn or testing or data communications or documentation under

UNIX

Call/rush resume to: DP Dept

VOLT

TECHNICAL SERVICES DIV
(800) FOR-VOLT 212-309-0300
101 Park Ave. NY, NY 10178
An Equal Oppty Employer m/f

ABBED AND FINANCE MIS DEPARTMENTS
INDIANA UNIVERSITY OF PENNSYLVANIA invites applications for temporary positions or branch campus centers in Business Education and Law and in Finance/MIS. These positions are available for the Fall Semester of 1987. Qualifications: Candidates with master's degree supported by related work experience will be considered.
Duties: Will include teaching and advising business students.
Send application, resume, transcripts and three references to Computer and Office Information Systems Search Committee, Indiana University of Pennsylvania, Indiana, PA 15705. Telephone (412) 357-2929. Please indicate a preference for Armstrong or Punxsutawney Campus. Review of applications will begin July 15, 1987 and continue until position is filled.
IUP is an Affirmative Action/Equal Opportunity Employer

VERMONT

& Rural Northern New England

- DATA BASE ADMINISTRATOR
- PROGRAMMER/ANALYSTS
- SYSTEMS ANALYSTS
- PROJECT LEADERS
- SYSTEMS PROGRAMMERS

3-5 years Manufacturing, Insurance or Banking experience & IBM 43XX DOS-VSE, 30XX OS/MVS, COBOL, BAL, BASIC, CICS, IDMS, S/38 RPGII, S/38 RPGIII, HP3000, DEC Datacomm, Telecomm, Vantage. Fee paid. Salaries $18 to 45K plus relocation assistance.
Please send resume in confidence to:

[redacted]

PROGRAMMER/ANALYST. Convert specific engineering & mechanical problem formulations to EDP format; apply engineering & computer sci. principles to develop programs & subroutines for processing analytical & mathematical problems & equations. Master's degree in Comp Sci or Bach's degree in Comp Sci + 1 yr exp in engineering-related programming or analysis. Must know: COBOL, FORTRAN, BASIC, database mgmt & data communications. Must have engng. background or have taken courses in engrg for comprehensive analysis of scientific, engrg & mechanical problem formulations to EDP format. $30,000/yr. 40 hrs/wk. Wolff & Munier. Send resume to: CW-84941, Computerworld Box #171, Framingham, MA 01701-9171

CLASSIFIED ADVERTISING ORDER FORM

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time, Services & Software, Employment Today and Buy-/Sell/Swap. (Available upon request: Software Wanted, Real Estate, and others).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines. Any special artwork should be enclosed with your ad also. Logos must be submitted on white bond paper for best reproduction.

Cost: Our rates are $176.40 per column inch. (Each column is 1 13/16") Minimum size is two column inches (1 13/16" wide by 2" deep) and costs $352.80 per insertion. Extra space is available/and billed in half-inch increments and costs $88.20. Box numbers are $15.00 extra per insertion.

Billing: If you're a first-time advertiser, (or if you have not established an account with us.) WE MUST HAVE YOUR PAYMENT IN ADVANCE, or a Purchase Order Number. Any extensions on this policy must be made through our Credit Department.

Ad size desired: _____

_____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Name: _____

Company: _____

Title: _____

Address: _____

_____

Telephone: _____

Send this form to:

COMPUTERWORLD
CLASSIFIED ADVERTISING
375 Cochituate Road
Box 9171
Framingham, MA 01701-9171

Telecopier service is available

Call 800-343-6474 or 617-879-0700
extension 739 or 740

MANAGEMENT CONSULTANTS

Deloitte Haskins + Sells Management Advisory Services Group is expanding rapidly. We are looking for people to staff a large state-of-the-art project that involves structured design, a relational data base, and 4th generation development facilities.

Programmer/Analyst Attributes

- Data flow diagramming
- Use of 4GL development facilities (IDEAL preferred)
- Data base experience (Datacom/DB preferred)
- Interactive program development (ROSCOE, TSO/ISPF)
- Procedural language programming (COBOL, PL1)
- IBM JCL

Systems Analyst Attributes

- Logical data base design
- Application development methodologies
- Project management
- Programming and data base experience
- Application testing and quality assurance

If you are interested in working with highly motivated and experienced professionals in a fast-paced environment and are willing to travel, this opportunity may be right for you. We offer a competitive salary and benefits package. Please send your resume to: C.H. Smith, P.O. Box 81026, Chicago, IL 60681-0026. An Equal Opportunity Employer M/F

Deloitte Haskins + Sells

DATA BASE ANALYST

MSU System Services, Inc., the technical service subsidiary of the Middle South Utilities System has an excellent career opportunity for an experienced Data Base Analyst.

The position involves designing and implementing physical data bases for in-house developed applications as well as implementing and tuning package applications. This position requires a thorough knowledge of IMS concepts with 1-2 years experience performing DBD, PSB, MFS, and ACB gens. Knowledge of IMS utilities including reorganizations, recovery, and SMU II is required.

MSU System Services, Inc. offers an exceptional Relocation Package including Relocation Allowance (one month's salary)... Paid Moving Expenses... Paid House Hunting Trip... Mortgage Interest Differential plus Interim Living.

For more information, call our toll free number below or send your resume to: Priscilla R. Crane, MSU System Services, Inc., P.O. Box 61000, New Orleans, LA 70161.

1-800-231-4481

In Louisiana call collect (504) 569-4951

MIDDLE SOUTH UTILITIES SYSTEM

MSU SYSTEM SERVICES, INC.

An Equal Opportunity Employer M/F/H/V

Programmer Analyst System 38

Exceptional opportunity for a Programmer Analyst to excel and grow with this leader in health care. We are a 170 physician multi-specialty clinic.

We offer: * Attractive salary, * Outstanding benefits

The area offers: * Easy access to NY and PA recreational and cultural activities, * Reasonable cost of living, * Excellent school systems

Our environment features an IBM System 38 Model 40 RPG III. If you have two plus years experience in an online real time environment and want to be a part of this dynamic, aggressive, growing corporation, send resume to:

Guthrie CLINIC
Guthrie Square
Sayre, PA 18840
Attn: Personnel Director

INFORMATION SECURITY-ACF 2/RACF/TOP SECRET

Prestigious consulting firm is looking for a strong Information Security Specialist who knows ACF 2, RACF, Top Secret or a similar information security package. Must have prior design or development experience. Salary ranges into the upper $40's. For more information, call or send us your resume.

ROBERT HALF
Data Processing
7733 Forsyth Blvd.
St. Louis, MO 63105
314-727-1838

RESEARCH TRIANGLE OPPORTUNITIES

The Underwood Group Inc

At First Interstate Services we have a commitment to supporting Model 204. And that commitment is growing, just like First Interstate.

First Interstate Services also supports a set of company values. Values like respect, unity, excellence and customer service. That means that we support our people as much as we do our technology.

Right now, we're looking for people who know a lot about some exciting technology: Model 204 database. We have a lot of projects going and growing on both the technical and applications areas at our Los Angeles Center. Take a look and see how to support a move to First Interstate.

MODEL 204 TECHNICAL SUPPORT

Systems Analyst

Requires 3-5 years Model 204 experience in an IBM mainframe environment including:

Performance monitoring and tuning/Systems configuration/Recovery procedures/Installation and maintenance of Model 204 Software/Problem determination and resolution/Capacity planning/System support of Model 204 DBMS/Database definition and development/MVS/XA architecture and ACF/2 helpful.

APPLICATIONS DEVELOPMENT

Providing support and development for Customer Information File development as well as applications support in other areas.

Programmer Analyst Specialist

Act as lead and control design for Customer Information File Model 204 applications. Activities will include coordination of all application design activities to insure application requirements are met. Requires:

2-4 years experience with Model 204 application design including:

Logical data modeling, Model 204 User's Programming Language, Model 204 on-line applications, Physical database design/2-4 years experience in an IBM mainframe environment.

At least 3 years structured system design experience/Project leader or project management experience helpful.

Programmer Analyst Specialist — File Manager

Perform as File Manager for all application database design activities for Customer Information File project. Activities will include: Providing central communications between project team and database administrator; Analysis and design; Logical data modeling and Physical database design.

Requires:

Model 204 Release 9.0 experience or CCA class Model 204 Release 9.0/2-4 years IBM mainframe/2-4 years large scale applications development experience.

Programmer Analyst

Involved in development of Model 204 applications for Customer Information File project. Requires:

1-2 years large scale applications development/1-2 years Model 204 applications development experience/Knowledge of: Structured systems, analysis and design, Model 204 User Language, Model 204 on-line applications development and Physical database design.

Submit all resumes to: MODEL 204 — HR, P.O. BOX 54360, MAIL SORT G7-25, LOS ANGELES, CA 90054

First Interstate Services

COMPUTER NUMERICALLY CONTROLLED MACHINE TOOL SALES ENGINEER. Send Resume To: Employment Security Department, ES Division, Attn: AEC No. 45940, Olympia, Washington 98504. Job Description: Demonstrate and explain on the basis of professional engineering skill, education and experience the principles of Computer Numerically Controlled (CNC) Turning Centers, Machining Centers, CNC Lathes, CNC Mills and Fabricating Equipment, such as CNC punch presses and programmable press frames, responsible for performing time studies on proper tool selection for CNC machines to prospective customers by reviewing their processes and blue print drawings. Required to be familiar with cutting tools and speeds for different workpiece materials as well as cutting tool's nomenclature, geometry and their different materials and grades, i.e. HSS, carbides, coated carbides etc. Required to handle liaison with sales force and customers, and to make recommendations to customers on the operation and installation of the CNC machines handled by employer. Responsible for furnishing professional expertise in the computer programming systems for CNC machines to prospective customers. Required to prepare budget estimates. Requirements: Master of Science Degree in Engineering Technology, with emphasis on computer science. Five years of related occupation as General Manager in charge of Sales and Engineering Work. Transcripts required. Salary: $2,500 per month. Position Offers: Prevailing working conditions, 40 hours per week, 8am to 5pm Monday through Friday. Position in Tukwila, WA. On the job training not offered. Equal opportunity employer.

Manager Of Manufacturing Systems

One of Southern California's leading Aerospace companies is looking for a dynamic, leadership-oriented manufacturing systems professional with 10 years' experience in MRP II, Shop Floor Control, Process Planning, Tooling, and IE Standards.

This position also requires a minimum of 2 years' experience supervising application systems development managers and an equivalent background working with a distributed processing architecture. A Bachelor's degree in Computer Science, Math, or Engineering is essential. A Master's degree is highly desirable.

Please send your resume to:

Manufacturing Systems Manager,
Dept. 334 MBW
P.O. Box 76387
Los Angeles, CA 90076

U.S. Citizenship Required.
Equal Opportunity Employer M/F/H/V

NEW ENGLAND

BOSTON
PROJECT LEADERS — INVESTMENTS
BOSTON area has outstanding oppty's for sr. analysts w/securities acctg. or banking appls. devel exp. Lead proj. team in major on-line effortsl Prev. IBM MVS, COBOL, CICS & excellent written/verbal skills req. Salaries to $50,000.

BOSTON
BANKING SW CONSULT.
BOSTON based SW vendor/consult. seeks talented bank appls specialists for diverse turnkey devel. or mod. & install of pkg. products. Knowl. of IBM OS/MVS COBOL essential, w/any DBMS or CICS expertise very desirable. Excapt. adv. & bonus pot.! Salary to $45,000.

BOSTON
PROG./ANALYST — HP3000
Large SUBURBAN mfg./dist. firm seeks solid P/A for bus. appls. devel. team. Environ. is HP3000 COBOL COGNOS. Oppty. to join a Fortune 500 firm with vis. to corp. execs. Salary to $32,000.

HARTFORD
PROJECT LEADER
CT fin'l. svcs. firm seeking indiv. to install new investments banking sys. using IMS, COBOL/PROJECT user interface skills req'd Full reloc. Salary to $50,000.

HARTFORD
DB2
CT mgmt. svcs. firm req's. 2+ yrs. internals exp. to provide top level design/training to major area Fortune 500 Co's. Excellent comp. package. Full reloc. Salary to $55,000.

HARTFORD
MVS SYSTEMS PROG.
SUBURBAN HTFD. oppty for MVS sys. prog. w/min. 2 yrs. exp. Opptv. to be involved w/perf. capacity plng. & VTAM/SNA installs. Excellent growth pot. for indiv. seeking a tech. challenging pos. Salary to $34-$43,000.

ROBERT HALF

EDP PERSONNEL SPECIALISTS
Contact the Manager of any office listed below.
100 Summer St., Boston, MA 02110
(617) 423-1200
111 Pearl St., Hartford, CT 06103
(203) 278-7170
Client Companies Assume All Fees.

COMMUNICATION SOFTWARE ENGINEER

Must be able to develop software in CHILL (High Level Language) for performing telephonic functions in a Private Automatic Branch Exchange (PABX). Design software to implement U.S., signalling systems and features, specification writing, coding and integrated testing. Bachelor's degree in Electrical Engineering, Computer Science or related degree is required. Must have a minimum of one year experience in job offered. Advanced degree accepted in lieu of experience but must have knowledge of telecommunications software application. Forty hours per week; $33,000 per annum.

Send resumes to:
Job Service of Florida
105 E. Broward Boulevard
Ft. Lauderdale, FL 33301
Job Order #FL 5748330

PERMANENT OR SUBCONTRACTORS

Programmers
Programmer Analysts
Systems Analysts

We need data processing professionals with three years experience in:

- IBM, CICS, DL1, IMS DB/DC, FOCUS, ACP, ASSEMBLER
- MSA Software
- SPERRY
- RPG II

Please forward resume to:
Integrated Computer Services Inc.
5100 Poplar Avenue, Ste. 2518
Memphis, TN 38137
(901) 761-7812

COMMUNICATION SOFTWARE ENGINEER

Must be able to design and develop sophisticated software for telephony switching applications as well as test specifications requirements such as fault localization in Saturn PABX. Duplication of fault situation in the Saturn system and tracing the faults to their source language. USE IBM 360/370 using TSO/SPF and CHILL as the source language. Develop of trouble reporting database for PC's. Develop a remote TC to mainframe comms. "dialler method". Bachelor's degree in Electrical Engineering, Computer Science or related degree is required. Must have a minimum of one year experience in job offered. Advanced degree accepted in lieu of experience but must have knowledge of telecommunications software applications. Forty hours per week; $43,000 per annum.

Send resumes to:
Job Service of Florida
105 E. Broward Boulevard
Ft. Lauderdale, FL 33301
Job Order #FL 5748328

Computer Professionals
Systems Programmers
Analysts and Programmer Analysts

IMS DB/DC, CICS (Learn DB2)	To $38K
IBM Bus Anal (MBA)	To $50K
MVS/VM Sys Prog	To $48K
PrA-FOCUS/COBOL	$36K
COBOL Prog (Train CICS)	$22-28K
ISPF Developer	$45-55K
PrA SAS/COBOL	To $37K
PrA 370 Assembler/ISPF	To $39K
SrA CMS/DL I/NOMAD	$29-36K
Prog CICS/ISDF	To $40K
Banking COBOL/FCL	To $37K
Sys Devel Mgr Manuf	To $48K
Sys Ana (2 yrs COBOL/MSA)	$25-37K
Sys 36-38 MAPICS	To $38K
DEC VAX/VMS Manuf	$25-35K
PrA's or DBA's (IDMS, IMS, ADABAS, NATURAL, ADR/DATACOM)	To $47K

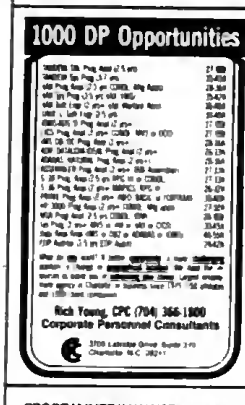
COAST-TO-COAST
Contact RON DOERFLER
All Fees Paid—Relocation Assistance
FOX·morris
212 S. Tryon St./Suite 1350
Charlotte, N.C. 28281
Call Collect (704) 375-0600

Computer Science
MIS Consultants
Arthur D. Little, Inc., a leading international consulting firm, has opportunities available for bright, energetic individuals to work on a variety of client assignments which include strategic information systems planning, data base modeling and design, software evaluation, and systems architecture. We require a computer science degree, 1 to 4 years experience and familiarity with structured systems analysis as well as computer aided software engineering. Send resumes to Ms. Diane B. Pelhey, Personnel Manager, Arthur D. Little, Inc., 20 Acorn Park, Cambridge, MA 02140. An equal opportunity employer, m/f.

Programmer Analysts
The City of Scottsdale, Arizona, has an excellent opportunity currently available for two experienced Programmer Analysts. These positions require strong experience with Unisys (Sperry 1100) and COBOL. Mapper experience is desirable. One position requires knowledge of MSA Financial Systems. Salary is negotiable based on experience. Qualified candidates should apply by September 4.

CITY OF SCOTTSDALE
Human Resources
7575 E. Main St., Ste. #205
Scottsdale, AZ 85251
(602) 994-2491
Equal Opportunity Employer

1000 DP Opportunities



Rick Young, CPC (704) 366-1800
Corporate Personnel Consultants
3700 Latrobe Drive Suite 310
Charlotte N.C. 28211

SOFTWARE CONSULTANT. Design, test, develop and modify computer software systems, in particular database management systems for UNIX* based uni-multiprocessor machines. Develop applications, tools and/or systems software in 'C' for the UNIX operating system environment. Evaluate and coordinate software development for future high performance database management systems and human computer interfaces. Computer languages required: 'C' UNIX-SHELL PROGRAMMING. Some projects are performed on client sites at various geographic locations. Minimum Requirements: M.S. in Computer Science. One course in each of the following: Compiler Design, Formal Languages, Database Management Systems and Distributed Systems. Must have completed one major project directly related to high performance database management systems in the UNIX operating system environment. Must be willing to travel on average of 25% of time domestically. 40 hours per week, 7:45 a.m. to 4:30 p.m. $36,000 per year. Submit resume to: Illinois Department of Employment Security, 401 South State Street, 3 South, Chicago, IL 60605, Attention: Mrs. D. Chatem. Reference #7055-S. AN EMPLOYER PAID AD

*UNIX is a registered trademark of AT&T

PROGRAMMER/ANALYST. Analyze, design, develop, code, implement & maintain computer application for company involved in the installation of a TPF-syst. Work w/a team to develop syst. Debug & enhance complicated all-computer-language syst. Develop documentation of the TPF-syst & train users on syst. Provide for back-up & recovery. 2 yrs exp. Must know the following: hardware & software: IBM 4361, TPF-Operating Syst, ASSEMBLER, PASCAL, BASIC, COBOL, FORTRAN, MICRO LANGUAGE REXX. $37,500/yr., 40 hrs/wk. Spindels Consulting Group. 10 East 21 Street, Suite 1304, New York, NY 10010. Send resume. Attn: K.S. (386)

SYSTEMS ANALYST

Develop and implement computer-based system programs and analysis methodologies for scientific and business applications, using IBM mainframe and PC. BS plus two years experience or MS in lieu of experience. Degree in Computer Science, Math, or Engineering, proficient in FORTRAN, COBOL, PASCAL, "C" languages. $3,000 per month. 40 hours per week. Job site/interview in Los Angeles, CA. Send ad and resume to:

CW-84946
Computerworld
Box 9171
Framingham, MA 01701-9171

PROGRAMMER/ANALYST. Analyze, design, code and implement & maint IDMS database program for a Customer Profile Inform Syst. of various fin'l financial co's & instit's. Co-design in COBOL/VSAM & CASH SWEEP SYSTEM a syst which allows money to be transferred from IRA funds to high-yielding Alliance funds. Analyze the Subsystem using T ROWE PRICE SYST in order to redesign & process new syst's. Maint prog. reports & all documentation. Design screen layouts for CASH SWEEP INQUIRY in COBOL/VSAM using CICS release 1.7. Test & debug Syst. using EASYTRIEVE. Develop standardization procedures for audit & control, back-up, recovery & restart. Instruct in use of syst. as well as in OS Utilities. 2 yrs exp. Bach degree in Math, Physics or Computer Sci. Must have the following exp. in database programming OS/MVS, VSAM, EASYTRIEVE, COBOL, TSO/ISPF, LIBRARIAN, IDMS, QUICKJOB, CULPRIT, PANVALET, CIMS, IBM 4341 & IBM 3601. $32,000/yr. 40 hrs/wk. Princeton Computer Consultants Inc. 20 Broad St. Suite 1302, New York, NY 10005. Send resumes. Attn: A.J. 360

The Right Move
Makes The Difference

Specializing in the Search and Recruitment of D.P., S/W & H/W Professionals nationwide for 14 years.
Currently representing the needs of several companies on an exclusive basis (25 to 75K). Call or send resume to
Preferred Positions Inc.
167 Main Dunstable Rd
Nashua, NH 03060
(603) 889-0112

CONSULTING OPPORTUNITIES

*IMS DB/DC
*IDMS/ADSO
*MODEL 204
*CICS/DL1
*DATACOM/IDEAL
*ADABAS NATURAL
*FOCUS
*COBOL or PL/1

(minimum 3 years programming experience required)

Datronics is currently staffing numerous projects throughout the southern states.

We offer top salaries, overtime pay, excellent benefits and paid relocation.

Please call collect at 214/386-6300 or send resume with salary requirements to Staffing Manager, Datronics, Inc., 1700 Alma Rd., Plano, TX 75075. (a suburb of Dallas)

Harris County Data Services (Houston, Tx.) has positions open for Systems Programmers and Programmer/Analysts. For full details, please send a detailed resume to:

HARRIS COUNTY
PERSONNEL DEPT.
914 PRESTON, 6TH FLOOR
HOUSTON, TX 77002
ATTN: JOYCE CAMBRIC

Systems Analyst:
Full-time and permanent job is available in a software firm. Design implementation, maintenance user interfacing and sales support of a 2-dimension and 3-dimension Computer Aided Design and Drafting System on both DOS and UNIX operating system, using computer languages such as Fortran, Assembly and C. Construction of mathematical and coding algorithms on specifications. Requires B.S. in Computer Science and 2 years of computer programming experience. $23,260.00 to start. Send resume to 7310 Woodward, Rm 415, Detroit, MI 48202; refer to No. 33587. Employer paid ad.

There's No Time For DOWNTIME!

And that goes for your business as well as your computer system!

So, while the industry works on your system's problems, let us work on your business problems. Advertise in—

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, **Computerworld Classifieds** will help you get a lot of exposure and get things done faster.

The open line rate is $12.60 per line and there is a minimum size of 1 column by 2" at a cost of $352.60. We can accomodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, cleanly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our adtakers will take ads that require no extensive artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

SOFTWARE ENGINEER

RDA LOGICON, a leader in the conceptualization and rapid prototyping of advanced systems for the government, has an immediate career opportunity available for a Software Engineer at our Pasadena facilities.

The successful candidate will be responsible for developing applications for a command and control system. Additionally, you will participate as an integral member of an implementation team. Familiarity with configuring the DEC and All-In-One office automation system is required. Knowledge of VAX/VMS, Fortran, C or ADA is strongly desired.

RDA offers an excellent salary, comprehensive benefits and the opportunity to participate in highly relevant and technical projects. For immediate consideration, please forward your resume accompanied by salary history to:

RDA LOGICON
P.O. Box 9695
Marina del Rey, CA 90295
Attn: Ms. R. Carsner

AAE/EOE U.S. CITIZENSHIP REQUIRED

RDA LOGICON

COMPUTER SPECIALISTS

$27,172 to $42,341

The **MILITARY SEALIFT COMMAND**, a worldwide transportation agency of the U.S. Navy, seeks qualified professionals to contribute to the development of command-wide INFORMATION SYSTEMS and DATABASES, utilizing IBM compatible hardware/software and IDMS/R DBMS. Previous government employment status is not required.

Computer Specialists (GS-334-11 and 12) will provide current technical guidance and analysis to the design of modern database structures for the development of information requirements for data integrity, security, stewardship and relational database management. Strong knowledge of information architecture, database development standards, and modern design methodologies is required.

To apply, send a resume or SF-171 to

MILITARY SEALIFT COMMAND
Command Information Systems
ATTN: Code M-8X
5611 Columbia Pike
Falls Church, VA 22041

For further information contact

Ms. C. F. Mosier, 703-756-1855

An Equal Opportunity Employer • U.S. Citizenship Required

STEP UP TO CONSULTEC!

Programmer Analysts
Senior Programmer Analysts
Systems Engineers

CONSULTEC, INC., a national leader in systems development for on-line, interactive data base applications, is growing rapidly. We seek a select group of competent and ambitious individuals to become a part of this exciting long-term growth.

Current positions, involving the design and development of on-line data base applications exist in:

HARTFORD, CONNECTICUT
ATLANTA, GEORGIA
COLUMBUS, OHIO
TALLAHASSEE, FLORIDA

The ideal candidates will be degreed and have three or more years of programming experience using COBOL on IBM/OS/MVS mainframes with good technical skills in VSAM, JCL, IMS or CICS.

We are not a contracting firm. We design, develop and implement large, complex high-volume systems on a project basis and our staff consists of the very highest caliber of talent. Training in data base or on-line development, growth into management, and relocation assistance are offered.

CONSULTEC offers the qualified candidates competitive compensation, excellent benefits and an outstanding environment for professional development. If you meet our requirements, send your resume in confidence or call today. **H.W. Burmeister, Manager of Recruiting, CONSULTEC, INC., 6065 Roswell Road, N.E., Suite 800 Northside Tower, Atlanta, GA 30328, (404) 252-2883 or 1(800) 358-2381.**

We are an *equal opportunity employer*

Consultec, Inc.

IBM SYSTEMS SOFTWARE PROFESSIONALS

Exceptional Tax-Free Salaries, Plus Bonus, Free Accommodation, Far East Trips, and more in

SAUDI ARABIA

The leading IBM compatible mainframe manufacturer wishes to appoint two software professionals to support their growing customer base. They will be given the opportunity to configure, generate, install, tune and support major IBM operating systems software in full-scale, state of the art configurations.

Outstanding experts with 3-10 years experience are sought. Key qualifications include:

Hands-on experience with MVS, MVS/XA.

BENEFITS:

Tax free salary, some married status positions, education allowance for approved dependents, free fully air conditioned compound living, transportation allowance, one month salary bonus on completion of the initial two year contract. Free medical and accident death insurance, two weeks paid leave on completion of each six months of service, free airfares (including leave flights to the Far East).

Saudi Arabia is an ideal spot for travel to the Far East and Africa.

Interested applicants should send a comprehensive C.V. and passport sized photograph and salary history to:

Kama Enterprises, Inc.
1515 SW Fifth Avenue, Suite 850
Portland, Oregon 97201
Attn: Dr. N. AlKhalidi

SOUTHERN CALIFORNIA
OVER 500 OPENINGS

IMS AND DB2 All Levels

FOCUS All Levels

Fin. Pkgs MSA, M&D, ISI, Ect.

HOGAN and other Banking Pkgs

ADABAS/NATURAL All Levels

COBOL, ASSEMBLER, PL-1 All Levels

DBA's IMS, DB2, IDMS, ADABAS, Ect.

SYSTEMS PROGRAMMING

MVS/XA Systems Programmers

IMS and DB2 Systems Programmers

CICS Systems Programmers

VTAM/NCP Systems Programmers

VM/SP Systems Programmers

TUNING and PLANNING Analysts

SOFTWARE DEVELOPMENT ENGINEERS

RESPONSE TIME, INC., EDP Search Division
ATTN: Dept 725
P.O. Box 54570
Los Angeles, CA 90054
(213) 488-7884

INFORMATION TECHNOLOGY DEPUTY DIRECTOR

Position serves as Deputy Director for Data Processing and Telecommunications services for the Department of Information Technology, which is established by the Code of Virginia as the central management agency responsible for providing technology services to all branches of State Government. Major duties include: managing and directing the agency's Data Processing and Telecommunications service operations and hardware, software and telecommunications systems in support of customer agencies and institutions. Must have extensive knowledge and experience in the management of Data Processing and Telecommunications service operations. Exceptional interpersonal and communications skills are essential.

We offer excellent benefits and relocation assistance.

Salary range: $55,799 - $76,208.

All applications/resumes should reference position #IT132 and must be received by August 31, 1987. Reply to:

Department of Information Technology
110 South Seventh Street, Third Floor
Richmond, VA 23219
Attention: Personnel

EOE/M-F

CADD MANAGER ENGINEERING

City of Chicago Department of Public Works is seeking a Manager for CADD Section to coordinate and manage installation, usage of CADD System for Engineering Design Bureau.

Ideal candidates will have a B.S. degree in Civil Engineering (Advanced degree in computer science highly desirable) and a minimum of 5 years engineering design experience with a minimum of 1 year in Prime and/or Intergraph systems.

Candidate will:
1. Provide guidance to user groups
2. Supervise and schedule CADD operations
3. Design and conduct training programs
4. Develop strategic plans
5. Coordinate consultants CADD Activities

Starting salary $2,400 to $3,397 per month in 1987. City offers full range of benefits. Must be a resident of City of Chicago at time of employment. Send resume to:

Personnel Section
Department of Public Works
320 North Clark Street, 6th Floor
Chicago, IL 60610

Equal Opportunity/Affirmative action employer

APPLIED COMPUTER ANALYST

The Applied Computer Analyst will provide analysis of computing problems with regard to feasibility and method, consult with users regarding their computing and statistical needs and aid in the development of plans to meet these needs, direct computer programmers engaged in consulting, programming, and teaching functions.

Bachelors degree plus graduate work, preferably a masters degree and four to eight years experience in programming work or an equivalent combination of education and experience. Send cover letter and resume to:

The University of Tennessee
Employment Services
804 Volunteer Blvd.
Knoxville, TN 37996

UTK is an EEO/Affirmative Action/Title/Section 504 Employer

FLORIDA CONNECTION

P/A's Cobol, PLT, IMS, IDMS ..... To $40K
S/E PLM 3088, ADA ..... To $45K
P/A's Burroughs IPS, Cobol ..... To $30K
Sr. Sys Prog MVS/XA, IMS, CICS ..... To $45K
Southern Resume Group

P/A's DOS/VSE, CICS, DL1 ..... To $35K
P/A's Sys 38, RPG3, Cobol ..... To $33K
Sr. P/A MVS Cobol, AGL, DB/DS ..... To $40K
Cavalcade Search Enterprises

Call for detail on other FL & SE positions.

AVA Affiliates

Since 1969

SMITHSONIAN INSTITUTION
DIRECTOR OF INFORMATION RESOURCE MANAGEMENT

The Smithsonian Institution is seeking candidates for the position of Director, Office of Information Resource Management, Washington, D.C. Salary range $63,135 to $72,500 per annum. Responsibilities include all aspects of developing, implementing, coordinating, and managing an Information Resource Management program for the institution. Candidates must have broad knowledge of Information Resource Management principles and techniques, demonstrated ability to manage the acquisition and implementation of automated systems for information management, knowledge of information requirements of large and complex organizations and of current information technologies associated with computer and communication systems, and demonstrated administrative and managerial ability. The closing date for applications is October 15, 1987. Send a Standard Form 171, Personal Qualifications Statement, and Curriculum Vitae to:

Employment Office
Smithsonian Institution
Washington, D.C. 20560
Attn: MPA-EX-02-87(A)

For further information, telephone:

Ms. Toni C. Lake
(202) 357-1354

An Equal Opportunity Employer

Experienced Programmer/Analysts

CALL US...

COME HOME TO ATLANTA

M.I.S. International, one of Atlanta's most dynamic consulting firms is enjoying exceptional growth making this a perfect time to step up to a permanent position on our technical staff.

We are interested in professionals with at least 2 years experience in the following:

- CICS, COBOL
- IDMS ADS/O, COBOL
- DB2
- SYS. 38, COBOL/MAPICS
- DEC VAX/VMS
- DATA GEN. BASIC/STS, OR COBOL

We offer competitive salaries, excellent benefits, relocation assistance and more.

Join us in the heart of Dixie. It's terrific!

For more information contact Marie Clark at 1-800-521-2144 or send your resume to **M.I.S. INTERNATIONAL, Corporate Headquarters, 23380 Commerce Drive, Farmington Hills, MI 48024.**

MIS
INTERNATIONAL INC

Farmington Hills • Atlanta • Ft. Lauderdale

Equal Opportunity Employer

SUNBELT LOCATIONS
- CHALLENGING OPPORTUNITIES
- PROFESSIONAL ENVIRONMENTS
- CAREER ADVANCEMENT
- QUALITY OF LIFE
- RELOCATION & FEE PAID

IBM TANDEM VAX

COBOL • IMS DB/DC • DL 1
CICS • IDMS/ADSO • UNIX
ORACLE • PATHWAY • TAL

SARAH RHODES, DPS
Phillips Personnel Services
PO Box 4245
Rock Hill, SC 29731

PROGRAMMER/ANALYST. Respons for development of software programs for managing memory allocation to optimize memory usage, multi-screen handling & window control. Design database handling through base-structure procedures for various lans syst's such as Invoice, billing & multi-user network. Define syst req's, data structures, data conversion procedures & syst's back-ups & recovery. Test & debug programs & prep syst's flow diagram, & race and report. Master's in Computer Sci or Computer Info Sci. Must know C, PL/1, UNIX & a background in database mgmt using relational database syst & tree structure analysis. $30,000/yr, 40 hrs/wk. Outcomp, Corp. 622 Broadway, Suite 5D, New York, NY 10012. Send resume. Attn: Maria

---

BURROUGHS

Immediate opportunities throughout the country for Programmers, Programmer Analysts, Systems Analysts, and Systems Programmers. Several additional immediate opportunities for individuals with LINC. To confidentially explore new career opportunities, rush a resume or call Gary Repetto, CPC.

DUNHILL OF
ALBUQUERQUE, INC.
1717 Louisiana NE, Suite 218C
Albuquerque, NM 87110
(505) 262-1671
Exclusively Employer Retained

Analyst/Programmer - Analyze users needs; design and develop telecommunications applications, software products, databases. Use IBM 4341, C, UNIX, IMS. Bachelor's degree/Computer Science. 1 year experience. 40 hours per week, $30,000 per year. Mail resume: NYS Job Service, JO #NY8017925, 250 Schermerhorn St., 3rd Floor, Brooklyn, NY 11201.

Managers Operations, quality control. Exp: 2 yrs tel manager Or tel system operator. Advise new hardware installation, check contract, assign duty, train system operators, supervise implementation/program, advise system shut down date, prepare report/solution. Basic knowledge IBM systems 36 & 38. Use beeper, available 24 hrs/wk for computer emergency. Work: 8-5 PM. $4,503/mo. Willing wk w/end o/t @ 1½ time. Woodland Hills, CA for job-/interview. Send ad/resume to job FC 7107, P.O. Box 9590, Sacramento, CA 95823-0590 not later than 8/25/87

COMPUTER SYSTEMS ANALYST - Will apply principles of management and information systems and Computer Science to analyze and improve existing computer programs. Duties also include programming, coding and implementing new computer programs as well as debugging and recommending changes to existing programs. Will consult with clients and analyze their respective needs for optimum performance of Information Systems. Duties also entail operation research. Salary $26,776 per year, basic 40 hour week, (9:00 am-5:00 pm). Requirements, high school graduate, 4 years college with Master's Degree in Computer Science, 8 hours course work in Operations Research. Send resume: MESC 7310 Woodward Ave., Room 415 (Reference No. 32367) Detroit, MI 48202. Employer paid ad

---

SYSTEMS PROGRAMMER

CW Transport, a major transportation company located in central Wisconsin, has an immediate opening for a systems programmer. Experience and qualifications should include a minimum of 2 years experience in operating systems programming on an IBM mainframe and a working knowledge of DOS/VSE. SPOCS, ASSEMBLER, VSAM, VTAM, and BTAM. Send resume to:

Director of EDP
CW Transport Inc.
810 High St.
Wisconsin Rapids, WI 54484
Tel. # (715) 424-4089.

EOE

MEMBER OF RESEARCH STAFF (Computer Science): Design and develop innovative CAD software tools to provide new ways for circuit designers to take advantage of present and future capabilities of VLSI technology. REQUIREMENTS: Ph.D. in computer science or physics and 2 years experience in computer aided design including extensive design of interactive graphics interfaces for both input and output. Must have thorough knowledge of high level strongly typed languages and of techniques in graphics editing. Must have used new and undocumented software tools on a daily basis with circuit designers. Must have a strong background in physical sciences. Must have demonstrated ability to do research in areas of large systems. $42000/mo. Palo Alto, CA. References required & offered employment, must show legal right to do work. Send resume to: Reply to CW-$4944, Computerworld, Box 9171, Framingham, MA 01701-9171. E.O.E.

PROGRAMMER ANALYST II

Programmer analyst II for a Western PA computer software company to analyze, code and test technical assignments utilizing IBM 370 Assembler and SAS languages. Participate in continued upgrading of existing high technology productivity enhancement software products; assist in resolution of problems with customer specific software applications.

Requirements: Bachelor of Science in Computer Science. Must have experience in systems programming, proficiency in IBM 370 Assembler and SAS languages, and be knowledgeable of MVS internals. Two (2) years experience in the position or Two (2) years as a Systems Programmer. 40 hrs/wk, Mon - Fri 8am-5pm. $25,500-$28,000/yr. Reply to CW-$4946, Computerworld, Box 9171, Framingham, MA 01701-9171

BUSINESS SYSTEMS PROGRAMMER/ANALYST

Develop and implement computer-based system techniques and analysis methodologies for business, accounting, and financial management. Two years experience with BSCS or BBA, or MSCS or MBA in lieu of experience. Knowledge of computer/programming (FORTRAN, "C", COBOL, PL-1) and accounting/financial analysis. $2950 per month. 40 hours per week. Job sites/interview in Fountain Valley, CA. Send ad and resume to:

#CW-$4942
Computerworld
P.O. Box 9171
Framingham, MA 01701-9171

PROGRAMMER/ANALYST. Perform technical functions in the development of the Credit Facility Tracking Syst for a major bank. Analyze program specifications, code the program using CICS Command Level. Test the program according to the assigned specifications. 2 yrs exp or 2 yrs as emp as a Syst. Prog/Syst Analyst. Bach deg in Math, Physics or Computer Sci or the teaching of these subjects. + Must know: IBM 3083 or OS/MVS-XA operating syst, COBOL, CICS/COMMAND LEVEL, VSAM FILES, PANVALET & other OS UTILITIES. $32,000/yr, 40 hrs/wk. Employer: Princeton Computer Consultants, Inc. 20 Broad St. Suite 1302, New York, NY 10005. Send resume attr: AJ-P080

COMPUTER SOFTWARE ENGINEER. Design, develop, test, and modify computer systems software applications and tools in "C" running under the UNIX* operating system. Test, evaluate, and develop network protocols including TCP/IP and NBS TP4/TP2. Design compilers and database systems. Evaluate the UNIX operating system and design subsystems within the operating systems kernel and of the application level to enhance and extend the functionality of the system. Some projects are performed on client sites at various geographic locations. Minimum Requirements: M.S. in Computer Science. One year experience in the position offered or one year experience as a research or teaching assistant. One course in each of the following: Computer Architecture, Compiler Design, Software Engineering, Database, Operating Systems and Programming Languages. Must have completed one major project in each: computer network protocols, UNIX operating system internals, compiler design. Must be willing to travel an average of 25% of time, domestically. 40 hours per week, 9:00 a.m. to 5 p.m. $35,000 per year. Submit resume to: Illinois Department of Employment Security, 401 South State Street, 3 South, Chicago, IL 60605. Attention: Mrs. S. Chatem, Reference #9860-S. AN EMPLOYER PAID AD.

* UNIX is a registered trademark of AT&T

COMMUNICATION SOFTWARE ENGINEER

Must be able to develop sophisticated software for telephony switching applications such as the DMI (Digital Multiplex Interface). Use of programming language C, IBM PC logic analyzer and INTEL ICE (In Circuit Emulator). Bachelor's degree in Electrical Engineering, Computer Science or related degree is required. Must have a minimum of one year progressive job offered. Advanced degree accepted in lieu of experience but must have knowledge of telecommunications software applications. Forty hours per week, $37,000 per annum.

Send resumes to:

Job Service of Florida
105 E. Broward Boulevard
Ft. Lauderdale, FL 33301
Job Order #FL 5746329

SYSTEMS ANALYST - Design and develop financial and accounting software packages, test and debug software; interface hardware and software. Provide system/user support. Program on IBM System 38 in RPGII, COBOL, PL/1 and BASIC. Implement graphics, PC connectivity and office automation. Bachelor's degree in Accounting or Computer Science. 2 years experience doing above or 2 years as systems engineer performing above. 40 hours per week (8am-5pm), $50,000 per year. Mail resume: Colorado Department of Labor and Employment, 600 Grant Street, Suite 900, Denver, CO 80203-3528. Ref JO# CO2880478

SYSTEMS ENGINEER: Full-time position to work in Central Ohio for a software consulting firm. Duties involve software development for telecommunications applications. No experience required. Qualified applicant must have an M.S. in computer science and a B.S. in engineering (any field). Must have written 2000 lines of 'C' language on UNIX as applications level and 1000 lines at the kernel level. Must have developed a relational data base in a UNIX environment. Must have taken an advance graduate-level courses in DBMS (Data Base Management System). Must have taken a graduate level course in computer networks including, as part of course, satisfactory completion of a project involving protocol implementation based on OSI (Open System Interconnection) Model. Must have independent research proficiency as demonstrated by publication of research work in a professional or academic publication of research work in a professional or academic publication. 40 hrs/wk. Salary $38,000 yearly. Send Resume and abstract of publication to M. Rush JO #3038946, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216

When you compare costs and the people reached, Computerworld is the #1 medium for computer-related recruitment advertising.
Place your ads today!
Call toll-free
800-343-6474
In Massachusetts
(617) 879-0700

PROGRAMMER/ANALYST

Major manufacturer located near Charlotte is seeking individual with minimum 3 years experience in on-line COBOL programming and systems design. Data General AOS/VS MV Series background a definite plus. Database (DBMS) experience also helpful. Please send resume including salary history in confidence to:

Brenda Warren
Director-Employee Relations
Intercraft Industries Corporation
P.O. Box 1227
Statesville, N.C. 28677

EOE

COMPUTERWORLD CLASSIFIEDS WORK!

- EMPLOYMENT TODAY
- BUY SELL SWAP
- TIME, SERVICES & SOFTWARE
- REAL ESTATE
- BUSINESS OPPORTUNITIES
- SEMINARS/CONFERENCES
- BIDS AND PROPOSALS

It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or a camera ready mechanical, stat or film negative of your ad, just call our ad-takers at 1-800-343-6474. They will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at COMPUTERWORLD (telecopier service is available); note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with your insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

Ad closing is every Friday, 6 working days prior to issue date.

Rates: Open rate is $176.40 per column inch. Columns are 2" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $352.80 per insertion. Additional space is available in half-inch increments. Some sample sizes and costs are shown.

1 col x 4" - $ 705.60
2 cols x 4" - $1411.20
2 cols x 5" - $1764.00
2 cols x 8" - $2822.40

Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld. Box Numbers are available, $15.00 per insertion.

To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

Boston - (617) 879-0700
(800) 343-6474

Los Angeles - (714) 556-6480

TELECOPIER SERVICE -
(617) 879-0700
or **(800) 343-6474**
ext. 739 or 740

DATA PROCESSING PROFESSIONALS

BROADWAY & SEYMOUR is a prestigious national consulting firm and a recognized leader in providing state-of-the-art solutions to a wide diversity of data processing needs.

We now have career opportunities available in St. Paul, Minnesota (Roseville area) for the following:

PROGRAMMER ANALYSTS - with a PL/1 type language (Pascal, PL/s, "C", ALGOL), VM/CMS and REXX or EXEC2 experience.

PROGRAMMER ANALYSTS - with IBM, OS/MVS and TELON experience.

DEC VAX SYSTEMS PROGRAMMER - with capacity planning experience and good communication skills.

We offer competitive salaries and a comprehensive benefits package that includes medical, dental, long-term disability and life insurance. For immediate, confidential consideration, please send your resume to:

Fred Brillante
Director of Human Resources

Broadway & Seymour, Inc.
Leaders in Information Systems and Services

302 S. Tryon Street Charlotte, NC 28202

An Equal Opportunity Employer M/F

Imagine

Working In A Company With Innovative Products Resulting In A Compound Annual Growth Rate of 100%.

At QMS, we create, manufacture and market intelligent graphics controllers for laser printers. We also offer an extensive line of impact printers used in industrial graphics and barcode labeling applications.

Our 10 year history of solving tough printing problems in the impact and non-impact worlds, has resulted in a rapid growth of nearly 100% per year and a reputation as a dynamic, innovative corporation.

Senior Level Engineers
Engineering Managers
Program Managers

To continue our growth in this explosive market, we have immediate positions available for individuals preferably from a larger commercial electronics company. Your 8+ years experience will provide leadership to a young, energetic, engineering staff. BSEE/BSCS required. Advanced degrees preferred.

A few positions are available for outstanding individuals with less experience.

QMS representatives will be interviewing for: **Engineering Managers, Hardware Engineers, Software Engineers, Quality Assurance Engineers, Mechanical Packaging Engineers, Product Publication Manager, Documentation Specialist.**

Applicants should be familiar with most of the following: Structured Programming, UNIX, C, 68000, Microprocessor Family Design, PAL Design, RIP Design, CAD/CAE, Worst Case Design Analysis/Simulation, PERT, MTBF Analysis, Surface Mount Technology.

At QMS, our technical people make major impacts on the success of the corporation. Please send resumes to: Ted Lahey, Human Resources, Dept. CW 8/10, QMS, Inc., One Magnum Pass, Mobile, AL 36618. Equal Opportunity Employer

QMS

Where Imagination Leads

DATA PROCESSING MANAGER

DURACELL, the world's leading manufacturer of premium high performance batteries, has an immediate opening for a Data Processing Manager at its Lexington, North Carolina location.

Successful candidates should possess a four year degree in one of the following disciplines: Business, Data Processing or Computer Science. A minimum of 4 years data processing experience in a manufacturing environment and 1 year supervisory experience is necessary. Must be proficient in Maplics and Business systems support. IBM Systems 34, 36 or 38 experience required. Experience with RPG III, Basic, Cobol languages; PC support (hardware & software) and spreadsheet and data base software.

Duracell offers a competitive salary and benefits package including a comprehensive medical, dental and life insurance program. Take this opportunity to further your career with an industry leader by sending your resume with salary history, in confidence, to: Staffing Manager, DURACELL, USA, 305 New Highway 64 East, Lexington, NC 27292. An equal opportunity employer M/F/H/V.

OVERSEAS JOBS!

TAX FREE INCOME

Our clients are hiring NOW for:

PROGRAMMERS/ANALYSTS
- IMS/CICS/ADABAS/IDMS
- RPG II, III/ORACLE/PCS

SYSTEMS PROGRAMMERS
- PRIMOS/VMS/AOS/MVS

SOFTWARE ENGINEERS
- CADCAM/UNIX-C

TECHNICIANS
- IBM MF/NP/DEC-VAX

MANY OTHER FIELDS

Sunday 9:00-3:00
Weekdays 8:30-5:30

(213) 382-9999

OVERSEAS CAREERS OF CALIFORNIA AGENCY

3701 Wilshire Blvd.
Dept. 222CW
Los Angeles, CA 90010

Advance fee required-refundable.
100% GUARANTEE AVAILABLE
Licensed and bonded
as an employment agency

GUARANTEED RESULTS!!

MARTIN MARIETTA DATA SYSTEMS

DISCOVER PROFESSIONAL CHALLENGE AND PERSONAL REWARD

Martin Marietta Data Systems, Orlando, Florida, is a leader in providing quality data processing services. Our commitment has allowed us tremendous growth in the past five years and we will continue to play an integral part in the data processing field. Discover the professional challenges the following opportunities can offer:

PROGRAMMERS/ANALYSTS—We are currently seeking several Programmer/Analysts with the following experience:

Two plus years progressive experience in the design and programming of applications using COBOL under IMS DB/DC. Experience with TSO/SPF, PANVALET and DB2 is strongly desired. A working knowledge of Barcode is a definite plus.

Two plus years Stratus FT250 (IBM System 88) experience required. COBOL under VOS/DOS and previous manufacturing or MRP applications experience a plus.

Three plus years experience with DEC VAC hardware and COBOL under VMS or IMS in a manufacturing applications environment is required. COMETS experience is strongly desired.

SYSTEMS PROGRAMMERS—We are seeking individuals with five plus years systems level applications design or VM/CMS internals experience. Excellent Assembler skills and experience in a CICS environment required. TSO under MVS and VM experience a plus.

PERFORMANCE AND TUNING SPECIALIST—Individual will have a minimum of five years systems programming experience including performance and tuning of MVS/XA, VM/HPO, DASD I/O Tuning, JES2, MICS, and SAS. IBM 3084 and/or 3090 experience is also required.

TELECOMMUNICATIONS SPECIALISTS—Candidates will be familiar with various modems, multiplexors and BSC/SDLC protocols. You must also have a minimum of two years experience in either COMTEN 3690 or IBM 3725.

BUSINESS MANAGEMENT ADMINISTRATOR—Qualified individual must have a minimum of four years finance related experience including Inventory Control, Standard Costing and variance analysis. You must also be knowledgeable in P.C. modelling.

In addition to challenging career opportunities, we offer a comprehensive salary/ benefits package that's tops in the industry, including company paid health, dental and vision insurance for you and your family, unique performance sharing plan and tuition reimbursement. The lifestyle in Central Florida is equally rewarding, with comfortable year-round climate, abundant recreational and cultural activities and very affordable housing. Qualified candidates should forward your resume along with salary history in confidence to: **Martin Marietta Data Systems, P.O. Box 13385-A, MP #357, Dept. CW-810, Orlando, Florida 32859-0385 or call 800-337-4574.** We are an equal opportunity employer, m/f/h/v

MASTERMINDING TOMORROW'S TECHNOLOGIES

MARTIN MARIETTA

LONG TERM, LUCRATIVE CONTRACTS

IMMEDIATE OPPORTUNITIES IN THESE SPECIALTIES AND MORE:

- STRATUS SPECIALISTS
- VAX/VMS/CIP/BROKERAGE
- ADR DATACOM/IDEAL
- DB2 DBA
- DB2 DATA DICTIONARY
- DBA STANDARDS, MODELLING
- IDMS IDD SPECIALIST
- IDMS PERFORMANCE/ TUNING
- DB2/CICS
- VM SYS PROGS/PROFS
- IDMS/ADSO/CICS/BATCH

CALL 212-766-4400

Mary Beth Walsh • John Williams

SPECTRUM CONCEPTS
150 Broadway, NY, NY 10038

ASSISTANT DIRECTOR OPERATIONS ANALYSIS

The University of Iowa Hospitals and Clinics, a progressive tertiary level health care center, has an available position as Assistant Director of the Operations Analysis (Management Engineering) Division in the Information Systems Department.

This position requires a Masters degree in management engineering or related discipline, or an equivalent combination of education and experience. Candidates should possess considerable experience (3-5 years) in management engineering applications as well as considerable experience in systems design and analysis.

Salary is competitive with liberal fringe benefits, and our location offers the cultural, recreational and educational benefits of a Big Ten university community. Send resume, references and salary history to:

Nancy R. Dyer
Information Systems
Building
University of Iowa Hospitals and Clinics
Iowa City, IA 52242

The University of Iowa is an Equal Opportunity Alternative Action Employer

NO JOBS
CAREERS
Programmer/ Analyst

A solid career path for creative, motivated professionals who enjoy success and have two years of experience in:
- IDMS ADSO
- IMS DB/DC
- DB2 SQL
- NOMAD

Join Merit Systems, a leader in Professional Services for the past ten years. For immediate confidential consideration, call collect or send your resume to:

Jim Whiteford (313) 879-7600

PRODUCT SUPPORT ENGINEER - Will perform product support engineering duties in connection with support of advanced telecommunication systems and products of employer. Perform electronic systems analysis and design duties. Support and maintain telecommunications packet switching data equipment and maintenance of software products in support of advanced telecommunications applications as part of product development/support staff. Bachelor's of Science Degree in Electrical or Electronics Engineering required, with 3½ years experience in the job offered or 3½ years experience as a Technical Service Representative. In lieu of Bachelor's of Science degree and 3½ years experience as Technical Service Representative, will accept degree with a 2 year degree in Electronics Engineering Technology and 4½ years experience as a Technical Service Representative. The 3½ years of experience must have involved technical support, software design, and design maintenance of PABX Systems (Private Automatic Branch Exchange). 40 hours, M-F, 8:00 A.M. - 5 P.M., $37,500/year. Send resume and social security number in Illinois Department of Employment Security, 401 South State Street - 3 South, Chicago, IL 60605. Attention: Robert S. Felton, Reference #V-IL-7157-F

EXPERIENCED SYSTEMS PROGRAMMERS, ANALYSTS AND PROGRAMMER ANALYSTS FOR SUNBELT LOCATIONS

Job dissatisfaction, complacency and frustration are the biggest obstacles to overcome to achieve one's career goals. Everyday new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligations, please call or write Keith Reichle, CPC Data Processing Specialist

Dunhill
OF CHARLOTTE, INC
6401 Carmel Road, Suite 107
Charlotte, North Carolina 28226
800-438-8912
(NC Call) (704) 542-0312

"With Computerworld, our client's recruitment ad dollars are well spent."

John P. Bertsch
President
Bertsch & Company
Advertising, Inc
New York, NY

John P. Bertsch is President of Bertsch & Company Advertising, Inc., a full service recruitment advertising agency headquartered in New York, with offices in Boston, MA and Irvine, CA. John is often asked by his clients to recruit data processing professionals and where to run their ads.

"Our clients are from varied interests — financial, food, high tech to mention a few," John explains. *"And most of them have at one time or another been looking for qualified data processing people. Our recommendation as to where to look? Not just in the local and national newspapers, but in Computerworld as well."*

"Why Computerworld? Quality. Computerworld delivers the high quality responses our clients need."

In fact, recently one of Bertsch & Company's clients found Computerworld's response to be higher both in quality and quantity than the local newspaper. *"As an advertising agency, we know we can't hire the candidate, but when we deliver the candidate it truly is a 'feather in our cap.' And I owe the thanks to Computerworld. It was our recommendation and it delivered."*

"Of course, that delights us both. My agency because we recommended Computerworld, and the client because he knows that, with Computerworld, his recruitment ad dollars are well spent," concludes John.

Computerworld. We're helping employers and top professionals get together in the computer community. Every week. Just ask John.

For all the facts on how Computerworld can put you in touch with qualified personnel, call your local Computerworld Recruitment Advertising sales representative.

COMPUTERWORLD

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700

NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652, (201) 967-1350

WASHINGTON, D.C.: 3110 Fairview Park Drive, Suite 1040, Falls Church, VA 22042, (703) 876-5100

CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018, (312) 827-4433

LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 261-1230

SAN FRANCISCO: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (415) 322-33314

An IDG Communications Publication

BUY SELL SWAP

THE BULLETIN BOARD

HONEYWELL

HONEYWELL DPS6 Ultimate System
(2) 288 MB hard disks with controllers
32 Ports
1600 BPI 75 IPS Tape
1000 LPM Printer
Plus Extras
Gould UPS System, 16 CRT's
Call Robert Goldstein
(201) 329-9150

DEC

DEC NEW & USED
BUY - SELL - EXCHANGE
Systems • Processors • Memory Options • Peripherals • Modules
LAKEWOOD COMPUTER CORP.
438 Link Lane
Ft. Collins, CO 80524
(303) 493-5466

FOR SALE
VAX 785XAAE
16 Mega Additional Memory
Serial #9405942RH FCC Cabinet
$99 000 Installed
Merida Trading Group
4C 038 Street
Woburn, MA 01801
(617) 933-6790

DEC

BUY-SELL-LEASE

VAX 750 2MB-VMS	$9 900
DHU11	$2 895
UDA50	$2,200
DEC MATE II	$1,295
PRO350 (from)	$750
DECNA	$200
LA100 PC	$550
MS11 PB	$850
MS750 CA	$800
MS780 FD	$250
RX02	$395
DLV11E	$95
DLV11J	$195
DF03	$75
11/44	$5,200
Kennedy 9300	$1,995
MS 630 BA	$395
Rainbow B	$1 095
Rainbow A	$395
RD53	$1 495
RX50	$295
DHV11M	$695
DZ11E	$495
DZV11A	$195
CDC9766	$2,200

Digital Computer Resale
(713) 445-0082

MERIDA TRADING GROUP
BUYS
SELLS
LEASES
All Digital Equipment
Please Call (617) 933-6790
Merida Trading Group

DEC

BUY • SELL • TRADE
Planning to buy non-DEC memory?
Check our DEC memory prices first!

1123-BE	MS750-HB	RL02-AK
1173-BE	MS780-JA	RL02K-DC
DHU11-AP	MSV11-JE	RLV12
MS86-CA	RH750-AA	VT100-AA

NEW YORK COMPUTER EXCHANGE
(516)752-8666 (800)645-9109

The Bulletin Board makes selling your equipment easy!

MISC.

NEW & USED RAISED FLOORING
Immediate Delivery
Quality Installation
RAISED COMPUTER FLOORS
One Charles Street
Westwood, NJ 07675
(201) 666-8200
Telex #13-5076

PRIME

TSI...YOUR FULL LINE VENDOR FOR ALL YOUR PRIME COMPUTER NEEDS
Buy • Sell • Lease • Rent

National	800-222-3475
Florida	800-421-4135
Northeast	800-874-3475

Timesharing Services, Inc.
4080 Woodcock Drive
Jacksonville, Fl 32207

PRIME COMPUTER
Buy • Sell • Lease
Warsed Prime 9950 Systems
Warsed Any
Prime Computer Hardware
Maintenance Contracts Available
Contrex International Incorporated
4116 Billy Mitchell Drive
Addison, TX 75244
(214)233-1900 Ask for George
(800)345-7888 outside Texas

LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS
SAVINGS TO 50%
Peripherals also available
1st SOLUTIONS, INC
11460 N. CAVE CREEK RD.
PHOENIX, ARIZONA 85020
(602) 997-0997
ASK FOR DON

Call to place your ad today
(800) 343-6474
(617) 879-0700

ORDER FORM
COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be cleanly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $178.00 (One unit minimum and no fractional units allowed.) You must run 4 ads in one month. There are no agency commissions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Issue Date:_____
Classification:_____
Name:_____
Title:_____
Company:_____
Address:_____
Telephone:_____

Send this form to:
COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 9171, Framingham, MA 01701-9171
617-879-0700 800-343-6474

DATA GENERAL

MV-10000 AVAILABLE FOR LEASE

12 memory/592 meg disk
Complete w/Software & Peripherals

The AmWest Group
251 New Karner Road
Albany, NY 12205
518-456-4567

FOR SALE

BRAND NEW
IN ORIGINAL CARTONS
MV-2000 with 4 MB memory
70 MB disk, 2 multiplexors
24 MB cart. tape, cables, CRT's
& AOS/VS with all licenses
25% off list
Kenco Data Systems
800-44-KENCO 716-417-8000

NPA SYSTEMS INC.

SALE, LEASE, & SERVICES OF DG EQUIPMENT

(516) 467-2500 (NY)
(415) 848-9635 (CA)
(214) 348-1682 (TX)

DISASTER PLAN & FACILITY MANAGEMENT ALSO AVAILABLE

Sell Your Product in the **BULLETIN BOARD**

HEWLETT PACKARD

S/70 & S/68

Also
HP 2392A Terminals
Qty. Available

Quantity Pricing Available

All in stock - immediate delivery
Subject to prior sale
All warranteed to qualify for manufacturer's maintenance

BUY * SELL * RENT * LEASE

Processors * Peripherals * Systems
From the HP 3000 Experts!

800/643-4954 213/829-2277

ConAm Corporation
It's Performance That Counts!

QANTEL

BUY SELL LEASE
QANTEL/NEC
CALL PROMPT COMPUTER

Dan Kobie
(216) 248-2698

NCR

buy ■ **NCR** ■ sell

Harwood International Corp.
100 Northshore Office Park
Chattanooga, TN 37343
Tel. (615)870-5900 Telex #3785891
We supply more NCR Computer Equip. To More NCR Users Than Any Other Company Except NCR!

IBM

BUY ■ SELL ■ SAVE $
IBM DISPLAYWRITERS
24's, 25's, 36's
5520 Systems
5210 Printers, 5553-1 Terminals

LRK RESOURCES UNLTD INC
CALL LAURIE OR RICK
713-437-7379

RENT
Mo. to Mo. Immed. Avail

3178	3191	3174	3360
3179	3270	3274	3287
3180	3279	3276	4234

All Other IBM Units Available
Call Penny 800/426-4361
In CA 408/241-3677
Marketex Computer Corp.

IBM

S/1 S/34 S/36
S/38 BUY 4300
SELL - LEASE - MAINT
Systems, Peripherals & Upgrades

Datamerc Computer Sales
765 Branch Dr, Alpharetta, GA 30201
Call Collect (404) 475-7507

For Sale
3276-12's
3287-2's
8K 0731's

Call Debbie
Midwest Computer
(312) 964-2220

S/36 S/38
Buy - Sell - Lease
We Pay Cash
for your used equipment
1-800-LEAS-PAK
In Texas: 1-800-722-7811
D/FW Metro: 267-2841

IBM 8100 Equipment For Sale

8140/C82 Processor	used
3262 Model 2 Printer	new
3287 Model 12 Printer	new
8809 Model 601 Tape Drive	new
8140 Model Upgrade Package from a 872 to a C72	new

Will sell as a package or individual units to best offer. Contact Jerry Gilbreath at (606) 269-5004

IBM

FOR SALE

IBM 3083B 16 x 16 w/3089
Available November 1, 1987

Contact Ken Firman at HL Industries, Inc.
(713) 987-4296

S/38 S/36 S/34
SERIES 1
BUY - SELL - LEASE
Systems, Peripherals & Upgrades

Source Data Products Inc.
800 Menlo Avenue # 200
Menlo Park, CA 94025
800/338-2669 415/328-7333

SALE/LEASE
4361-5
Available Now
Will Modify

Call Matt Steustein
(914) 238-9631
Computer Merchants Inc.

WANTED
S/38-MOD 20
3430-A1
3370-11s

Call Ron Gillo
(914) 238-9631
Computer Merchants Inc.

IBM

LEASE

4381-M01
With console
3375 x sale
3411-3 sale

Call
Floyd Conlin
Datalease
203-333-6170

WANG

HOLSON ASSOCIATES, INC.

Buy And Sell
[illegible]
For Wang Maintenance

2470 Windy Hill Road, Suite 253
Marietta, GA 30067
Call: Richard Holley or Carole Benson
(404) 980-1700

BUY - SELL
MVP/LVP ● OIS ● VS ● PC
SYSTEMS IN INVENTORY
VS-45 ● OIS ● VS-100
GENESIS
EQUIPMENT MARKETING
GEM
(802) 277-8230

TIME, SERVICES & SOFTWARE

COMPUTER SERVICES

Fortune 500 company willing to offer time on IBM 3081 MVS/SP and the use of CICS or IDMS/R at very economical rates.

Jim Stein
(502) 426-6455

9370? MVS? SAVE MONEY

If you want to run MVS on a 9370,
our product can **SAVE YOU $25,000 OR MORE FOR EACH INSTALLATION.**
For more information, contact:

Stuart R. Ehrlich
E & E Associates
3 Fletcher Road
Westford, MA 01886
(617) 692-5712

SHIP A DISK

Are you selling a software package? For the best results, advertise it in the **Time, Services & Software** section of Computerworld's classified pages. More than 600,000 computer-involved professionals receive Computerworld each week.

To inquire about our 1987 rates or to get a copy of Computerworld Rate Card #22, simply call toll-free at (800) 343-6474. In Massachusetts call (617) 879-0700. Call now. And don't forget to ask about earning linage discounts.

COMPUTERWORLD
Box 9171
375 Cochituate Road
Framingham, MA 01701-9171

Extension 739 or 740

COST EFFECTIVE COMPUTER SERVICES

Need to maximize capacity without additional capital outlay?

***BethSystems** will put 20 years of leading edge technology to work for you. We've got the cost effective service/solutions you want!*

- Large scale IBM capability

MVS/XA	IMS DB/DC	VM/370
JES 2	DB 2	CMS
TSO	FOCUS	SAS
CICS	DISOSS	PROFS

- Technical and network support
- 24-hour customer "HELP" desk
- Resource/facility management
- Engineering computing services
- Intergraph CAD/CAM — Graphics
- Consulting Services

Call (215) 694-7500

BethSystems

Bethlehem Steel Corporation
1642 Martin Tower ● Bethlehem PA 18018

CONVERSION ENGINE®

THE CONVERSION PROCESSOR THAT AUTOMATICALLY CONVERTS 95 TO 98% OF APPLICATION CODE TO A NEW LANGUAGE STRUCTURE, OR ENVIRONMENT.

- Migrate to new hardware/operating system
- Change data base managers
- Go to new on line monitor
- Re structure the code

A unique system, the Conversion Engine® can Re Engineer current applications – Lifting out logic, data flows, procedures, screen and print formats etc. –Generating the desired replacement code

Call or write

M.D. FRIEDMAN & Associates, Inc.

9241 LBJ Frwy #100 Dallas, TX (214) 644-1379

How to increase your power without paying the price.

Turn to Manufacturers Hanover Data Services Corporation for low-cost, state-of-the-art timesharing and Information Center services.

- Secure environment
- Software includes MVS/SP, VM/SP, VM/XA, TSO, GDDM CMS, and Presentation Graphics Equipment
- Processing done on IBM 3084 MX3 and IBM 4381 systems
- Accessible via many telecommunications methods
- Volume discounts

For more information write
Jeff Daum
Manufacturers Hanover Data Services Corporation
P.O. Box 26
Carlstadt, New Jersey 07072

Or call (201) 896-2030

MANUFACTURERS HANOVER

IBM is a trademark of International Business Machines Corporation

© 1987 Manufacturers Hanover Trust

ICOTECH

Innovative Computer Technologies

COMPUTER SERVICES
IBM 3081 DEC-10
VAX 8600

- Batch Processing
- Timesharing
- Public Network Access
- Laser Printing

Plano 9000 Parkway, Plano, TX 75023
(214) 423-3400 Contact: Joyce Chojnacki

R&R

Repair and Refurbishment

Mainframes ■ Minis ■ Micros ■ Peripherals

- Over 3,000 makes & models
- Board repairs to system overhauls
- Fixed & floppy drive repairs
- Class 100 clean room
- No order too large or small
- Fast, professional, *affordable* service

1-800-523-0254
In Pennsylvania (215) 265-6601

Sorbus®
A **Sell Atlantic™** Company

50 East Swedesford Road
Frazer, PA 19355

COMPUTING SERVICES

CPU 1	CPU 2
MVS/XA	VM/370
CICS	DOS/VSE
IMS	CICS
TSO	CMS

** IBM HARDWARE
** FULL TECHNICAL SUPPORT
** FOURTH GENERATION LANGUAGES
** NATIONWIDE ACCESS
** GUARANTEED RESPONSE AND AVAILABILITY
** FULL DISASTER RECOVERY BACKUP
** ON-SITE CUSTOMER AREA
** FULL SECURITY
** VOLUME AND TERM DISCOUNTS

For more information please contact

BURNS COMPUTING SERVICES, INC.

10 Gould Center
Rolling Meadows, IL 60008

Midwestern Sales (312) 981-5280
Eastern Sales (212) 432-1151 • (215) 398-3600

DEC SPECIALISTS

VAX 8600 & PDP-11
TIME SHARING
NO CPU CHARGES

$7/$10
RSTS/E VMS
PER HOUR
CONNECT TIME

BUDGET BYTES®
212-944-9230
EXT 110

TIMESHARING
GENERAL CONSULTING
SOFTWARE DEVELOPMENT
FACILITIES MANAGEMENT
COMPUTER EQUIPMENT & SUPPLIES
HARDWARE MAINTENANCE (NY METRO AREA)
MEDIA CONVERSION
EXECUTIVE SEARCH
SOLOMON ACCOUNTING SOFTWARE

Omnicomputer, Inc.®
1440 Broadway, New York, N.Y. 10018

"As soon as our ads started running in Computerworld, the phones started ringing."

— Art Ingram
Vice President, Marketing and Sales
Tangram Systems Corporation

Art Ingram is Vice President for Marketing and Sales for Tangram Systems Corporation of Cary, North Carolina, a micro-to-mainframe software vendor. Tangram is currently riding high on its Arbiter, a cooperative processing technology that allows the integration of PCs and mainframes, regardless of network configuration.

The start-up company, whose software is in place at government, financial and manufacturing sites, wanted to promote Arbiter — and itself. And Art had determined that the best place to do both is in the pages of *Computerworld*.

"We needed to get the message to MIS managers and users that we can help them integrate thousands of PCs into the mainframe environment with Arbiter Plus, as a new company, we were out to generate name recognition.

"It was clear from the start that Computerworld *would deliver the audience we're looking for because it addresses a broad cross-section of readers. All our campaigns are built around* Computerworld *and maybe one specialized publication. Take* Computerworld *out of the picture and there is no Number One choice.*

"As soon as our ads started running in Computerworld, *the phones started ringing. The inquiries we're getting are timely and responsive. And we're very impressed with the high level of decision makers who are calling.*

"Tangram is committed to Computerworld *for the future. It's our primary vehicle, and we have every intention of staying on this successful track."*

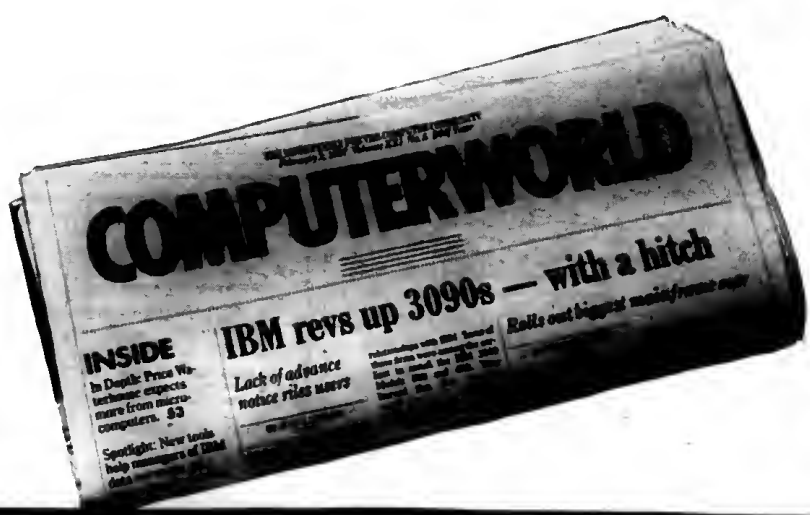
Computerworld. We're helping more suppliers reach more buyers more often in the computer market. Every week. We're working for Tangram Systems Corporation. We can work for you.

For all the facts, call Ed Marecki, Vice President/Sales, Computerworld, at (617) 879-0700 today.

Sales Offices

BOSTON/(617) 879-0700 **NEW YORK**/(201) 967-1350 **WASHINGTON D.C.**/(703) 280-2027 **ATLANTA**/(404) 394-0758 **CHICAGO**/(312) 827-4433 **DALLAS**/(214) 233-0882 **LOS ANGELES**/(714) 261-1230 **SAN FRANCISCO**/(415) 421-7330

An IDG Communications Publication



COMPUTERWORLD

SALES OFFICES

Publisher/James S. Povec

Vice President/Sales/Edward P. Marecki, **COMPUTERWORLD,** 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700

BOSTON SALES OFFICE Northern Regional Manager/Michael F. Ketcher, **District Managers/**David Peterson, Bill Cadigan, Sherry Driscoll, **Account Manager/**John Watts, **Sales Assistant/**Alice Longley, **COMPUTERWORLD,** 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

CHICAGO SALES OFFICE Midwest Regional Manager/Russ Gerches, **District Managers/**Kevin McPherson, Larry Craven, **Account Manager/**Robert A. Raudys, **Sales Assistant/**Kathy Sullivant, **COMPUTERWORLD,** 2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433

NEW YORK SALES OFFICE Eastern Regional Director/Michael J. Masters, **Senior District Manager/**Doug Cheney, **District Managers/**Fred Lo Sapio, Frank Genovese, **Account Managers/**Paula Smith, Helene Tepperman, **Sales Assistants/**Mary Tagliareni, Sue Larson, Eileen Lobaugh, **COMPUTERWORLD,** Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

LOS ANGELES SALES OFFICE Western Regional Director/William J. Healey, **District Managers/**Carolyn Knox, Gary Hooks **COMPUTERWORLD,** 18004 Sky Park Circle, Suite 255, Irvine, CA 92714 (714) 261-1230

SAN FRANCISCO SALES OFFICE Western Regional Director/William J. Healey, **Senior District Manager/**Barry Milione, **District Managers/**Ernie Chamberlain, Mark V. Glasner, Stevan Phillips, **Account Manager/**Alicia Hodge, **COMPUTERWORLD,** 300 Broadway, Suite 20, San Francisco, CA 94133 (415) 421-7330

ATLANTA SALES OFFICE Eastern Regional Director/Michael J. Masters, **District Manager/**Jeffrey Melnick, **Sales Assistant/**Melissa Christie, **COMPUTERWORLD,** 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0756

DALLAS SALES OFFICE Midwest Regional Manager/Russ Gerches, **District Manager/**Kevin C. Harold, **COMPUTERWORLD,** 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882

WASHINGTON D.C. SALES OFFICE Eastern Regional Director/Michael J. Masters, **District Manager/**Bernie Hockswender, **COMPUTERWORLD,** 3022 Javier Road, Suite 210, Fairfax, VA 22031 (703) 280-2027

PRODUCT CLASSIFIED ADVERTISING Product Classified Advertising/Account Manager Peter Slingluff, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

RECRUITMENT ADVERTISING National Recruitment Sales Director/John Corrigan, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

RECRUITMENT ADVERTISING SALES OFFICES

New England Recruitment Manager/Al DeMille
375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

Mid-Atlantic Recruitment Manager/Warren Kolber
Paramus Plaza 1, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

Midwest Recruitment Manager/Patricia Powers
2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433

Western Recruitment Manager/Barbara Murphy
18004 Skypark Circle, Suite 100, Irvine, CA 92714 (714) 250-0164

South-Atlantic Recruitment Manager/Kathryn Kress
3110 Fairview Park Drive, Suite 1040, Falls Church, VA 22042 (703) 876-5100

RECRUITMENT TELEMARKETING ACCOUNT EXECUTIVES
New England, New York/Jay Novack, **Mid-Atlantic/**Pauline Smith
Midwest/Ellen Casey, **Western/**Nancy Percival
Toll Free: 1-800-343-6474 or (617) 879-0700

FOREIGN EDITORIAL/SALES OFFICES

Argentina: Ruben Argento, CW Communicatore S/A, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: (011) 54 134-5583. Telex: (390) 22644 (BAZAN AR).

Asia: Euan Barty, Asia Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong. Phone: (011) 852 5 861 3238. Telex: (780) 72827 (COMWOR HX)

Australia: Alan Rowe, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (011) 61 2 4395133. Telex: (790) AA74752 (COMWOR).

Austria: Manfred Weiss, CW Publikationen Vetagsgesellschaft m.b.H., Josefstadter Strasse 74, A-1080 Wien, Austria. Phone: (011) 43 222486 5910. Telex: (847) 115 542 (SCH/A).

Brazil: Ney Kruel, Computerworld do Brasil, Rua Alcindo Guanabara, 25-11 andar, 20.031 Rio de Janeiro, RJ Brasil. Phone: (011) 55 21 240 8225. Telex: (391) 21 30838.

Denmark: Preben Engell, Computerworld Danmark A/S, Torvegade 52, 1400 Copenhagen K, Denmark. Phone: (011) 45 1955 695. Telex: (855) 31566

France: Jean-Louis Rendon Computerworld Communications S.A., 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, France. Phone: (011) 33 14 747 1272. Telex: (842) 613234 F

Hungary: Dezso Futasz, Computerworld Informatika Co., Ltd. H-1536 Budapest, Pf. 385 Hungary. Phone: (011) 36 1 228 468. Telex: (861) 22 6307 (KSHP H).

Italy: Dr. Bruno Fazzini, Computer Publishing Group S.R.L., Via Vida 7, 20127 Milano, Italy. Phone: (011) 39 02 2613432. Telex: (843) 336318.

Japan: Mr. Shuji Matsuuchi, Computerworld Japan, 7-4 Shiromi 1-Chome, Chuo-ku, Tokyo 104. Phone: (011) 81 3 561 3882. Telex: (781) 252-4217 (Computerworld Japan only).

M. Nakamura, IDG Communications, Japan, c/o Marcam International, Inc., Akasaka Center Building, 1-3-12 Moto-akasaka, Minato-ku, Tokyo 107, Japan. Phone: (011) 81 3 403-8515. Telex: (781) 27941 (Reps. for all CW Publishing publications except Computerworld Japan).

Mexico: Henry Morales, Computer Mexico S.A. de C.V., Oaxaca 21-2, Mexico City 7 D.F. Colonia Roma, 06700 Mexico. Phone: (905) 514-4218 or 6309. Telex: (383) 177 1300 (ACHAME).

The Netherlands: Wout Berends, CW Communications B.V., van Eeghenstraat 84, 1071 GK Amsterdam, The Netherlands. Phone: (011) 31 20 646426. Telex: (844) 18242 (CWCOM NL).

New Zealand: Reg Birchfield, CW Communications Ltd., 13 Maidstone St., Grey Inn, Auckland 1, New Zealand. Phone: (011) 64 9 768 963. Fax: (011) 64 9 780 244

Norway: Morten Hansen, CW Norge A/S, Kowmeen 43, P.O. Box 2862, Toyen, 0608 Oslo 6, Norway. Phone: (011) 472 647725. Telex: (856) 79476 (CW NOR N).

People's Republic of China: Chen Mingkun, China Computerworld, 74 Lu Gu Road, Box 750, Beijing 100039, People's Republic of China. Phone: (011) 47 814 8174. Telex: (716) 222214 (CCW CN).

Spain: Francisco Zabala, Computerworld Espana, Rafael Calvo 18 4E, 28010 Madrid, Spain. Phone: (011) 34 1 419 4014. Telex: (831) 47894 (CW E).

Sweden: Bengt Mannfeldt, CW Communications AB, Sodra Hamnvagen 22, S-115 41 Stockholm, Sweden. Phone: (011) 46 8 67 91 80. Telex: (854) 14904 9 (NOVACW)

Switzerland: Gebhard Osterwalder, CW Publikationen AG, Wiesenstrasse no. 15, Postfach 253, CH 8030 Zurich, Switzerland. Phone: (011) 41 1 55 10 77. Telex: (845) 816 710.

Taiwan: Leona Wang, ACE Media Agency Co. Ltd., P.O. Box 26-578 Taipei, Taiwan, R.O.C. Phone: (011) 02 751 3636. Telex: (785) 14142 (ACE GROUP). (Representative for all CWCI publications).

London: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, WC1 8UT, United Kingdom. Phone: (011) 44 1 831 9252. Telex: (851) 262346.

United Kingdom: Euan Rose, Beere Hobson & Associates, 34 Warwick Road, Kenilworth, Warwickshire, CV8 1HE, United Kingdom. Phone: (011) 09 26 512424. Telex: (851) 311951 (BEEHOB). (Representative for all CWCI publications)

Venezuela: Kalman von Vajna Nagy, CW Comunicaciones, C.R.L. Torre Maracaibo, Piso 13, Ofcina H, Av. Libertador Caracas, Venezuela. Phone: (011) 58 2 72 76 30.

West Germany: Eckhard Utpadel, CW Publikationen Verlagsgesellschaft mbH, Rheinstrasse 26/28, Postfach 40 0429, 8000 Munchen 40, West Germany. Phone: (011) 49 89 360860. Telex: (841) 5215350 (COMW D)

IDG COMMUNICATIONS/INC.

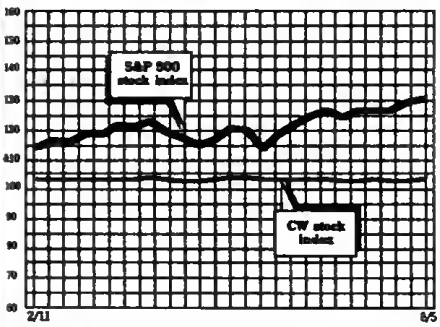
ADVERTISERS INDEX

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

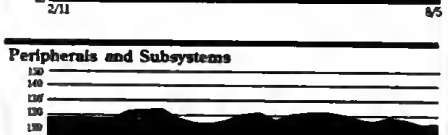
Upcoming Computerworld Spotlight Sections

Issue Date	Topic	Ad Closing Date
Aug. 31	DBMS for Micros & Small Systems	Aug. 14
Sept. 14	DB2 Market	Aug. 28
Sept. 21	Hardware Roundup: Large & Medium Scale Systems	Sept. 4
Sept. 28	Hardware Roundup: Small Scale Systems	Sept. 11
Oct. 5	Hardware Roundup: Micros	Sept. 18

STOCK TRADING INDEX



Indexes	Last Week	This Week
Communications	101.8	103.4
Computer Systems	123.6	123.5
Software & DP Services	131.6	134.4
Semiconductors	117.1	120.3
Peripherals & Subsystems	113.0	114.1
Leasing Companies	116.7	120.9
Composite Index	103.1	103.5
S&P 500 Index	129.4	130.5



CW CHARTS: AMY J. SWANSON

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUG. 5, 1987

EXCH		52-WEEK RANGE (1)		CLOSE AUG. 5 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Communications and Network Services						
N	AMERICAN INFO TECHS CORP	101	77	88.75	+0.6	+1.0
Q	ANDREW CORP	18	14	16.25	-0.8	-4.4
Q	ARTEL COMM CORP	5	2	2.88	+0.0	+0.0
N	AT&T	33	22	32.88	+0.5	+1.5
Q	AVANT GARDE COMP INC	7	3	3.63	+0.8	+18.3
Q	AVANTEK INC	19	13	14.88	+0.3	+1.7
N	AYDIN CORP	38	18	30.63	-2.0	-6.1
N	BELL ATLANTIC CORP	77	62	89.00	+1.5	+2.2
N	BELLSOUTH CORP	86	35	39.25	+0.3	+0.6
Q	BRIDGE COMMUNICATION	27	11	22.00	+1.6	+8.0
Q	COMPRESSION LABS INC	13	4	4.38	-0.3	-6.7
Q	COMPUTER NETWORK TECH	6	4	4.56	+0.0	+0.0
Q	CONTEL CORP	37	27	36.50	+3.5	+9.8
Q	DATA SWITCH CORP	8	6	8.38	+0.0	+0.0
Q	DIGITAL COMM ASSOC	88	17	36.50	+2.0	+5.8
Q	DYNATECH CORP	44	27	28.50	+0.4	+1.3
Q	EQUATORIAL COMM CO	6	2	3.00	-0.3	-7.7
Q	GANDALF TECHNOLOGIES	11	5	7.25	+0.3	+3.6
Q	GENERAL DATACOMM INDS	14	8	8.63	-0.3	-2.8
N	GTE CORP	43	34	41.63	+2.3	+5.7
Q	INFOTRON SYS CORP	13	7	9.00	+0.0	+0.0
N	ITT CORP	86	47	63.75	+1.1	+1.8
N	M A COM INC	16	12	15.88	+0.3	+1.6
Q	MCI COMMUNICATIONS CORP	8	5	7.88	+0.0	+0.0
Q	MICOM SYS INC	16	10	11.75	+0.6	+5.6
Q	NETWORK SYS CORP	16	9	10.25	-0.1	-1.2
N	NORTHERN TELECOM LTD	34	14	21.50	-0.3	-2.3
Q	NOVELL INC	27	8	16.00	+0.8	+2.7
N	NYNEX CORP	73	59	70.20	+2.3	+3.8
N	PACIFIC TELESIS GROUP	31	23	27.13	+0.8	+2.8
N	PARADYNE CORP	8	4	8.63	-0.3	-3.6
A	PENRIL CORP	8	4	8.88	+0.4	+4.3
N	PLESSEY PLC	41	24	32.13	-1.9	-5.5
N	SCIENTIFIC ATLANTA INC	20	8	17.88	+1.1	+6.7
N	SOUTHWESTERN BELL CORP	41	33	39.00	+1.8	+5.1
Q	SYCOM CORP	34	8	15.75	+1.0	+6.8
N	TIMEPLEX INC	41	16	33.13	+0.1	+0.4
Q	UNGERMANN BASS INC	16	7	10.20	-0.6	-5.6
N	U S WEST INC	62	45	52.63	+0.8	+1.7
Computer Systems						
Q	ALLIANT COMPUTER SYS	37	16	18.75	-1.6	-7.4
Q	ALPHA MICROSYSTEMS	7	3	5.13	+0.1	+2.8
Q	ALTOS COMPUTER SYS	17	10	12.50	+0.3	+2.0
N	AMDAHL CORP	42	17	36.75	+0.3	+0.7
Q	APOLLO COMPUTER INC	29	9	18.25	+1.0	+5.5
Q	APPLE COMPUTER INC	45	18	43.25	+2.3	+5.5
N	BOLT BERANEK & NEWMAN	30	19	20.00	+0.0	+0.0
Q	BRITTON LEE INC	5	3	3.25	+0.8	+30.0
N	COMPAQ COMPUTER CORP	51	13	47.00	+0.0	+0.0
Q	COMPUTER AUTOMATION INC	17	2	11.75	+0.0	+0.0
A	COMPUTER CONSOLES INC	12	7	8.13	-0.6	-7.1
Q	CONCURRENT COMP CORP	20	11	18.50	-0.3	-2.6
N	CONTROL DATA CORP DEL	35	20	33.25	+5.6	+20.4
Q	CONVERGENT TECH	12	4	7.25	+0.0	+0.0
Q	CONVEX COMPUTER CORP	22	6	15.88	+1.6	+13.4
N	CRAY RESH INC	136	88	104.88	+3.0	+2.9
Q	DAISY SYS CORP	13	7	7.75	+0.8	+10.7
N	DATA GEN CORP	39	25	32.25	+0.3	+0.8
N	DATAPOINT CORP	8	4	8.88	+0.8	+12.2
N	DIGITAL EQUIP CORP	179	88	165.25	+4.8	+3.0
N	FLOATING POINT SYS INC	17	6	10.00	-1.5	-13.0
N	GOULD INC	25	16	21.75	-1.4	-5.9
N	HARRIS CORP DEL	43	27	38.13	+1.6	+4.7
N	HEWLETT PACKARD CO	67	37	62.25	+0.3	+0.4
N	HONEYWELL INC	88	58	84.75	+2.0	+2.4
N	IBM	170	116	130.25	-1.3	-0.8
Q	INFORMATION INTL INC	17	13	14.00	-0.3	-1.8
Q	IPL SYS INC	3	2	2.88	-0.3	-8.0
Q	MASS COMPUTER CORP	10	5	8.75	+0.3	+2.8
N	MATSUSHITA ELEC INDL LTD	173	81	168.20	-1.8	-1.0
Q	MEGADATA CORP	7	2	5.00	+0.0	+0.0
Q	MENTOR GRAPHICS CORP	34	11	28.25	-0.4	-1.3
N	NBI INC	14	8	12.13	-1.0	-7.6
N	NCR CORP	30	42	75.20	-1.8	-2.2
N	PRIME COMPUTER INC	30	16	26.13	+0.0	+0.0
Q	PYRAMID TECHNOLOGY	12	4	7.75	-0.3	-3.1
Q	STRATUS COMPUTER	41	16	27.20	+0.5	+1.8
Q	SUN MICROSYSTEM INC	85	11	34.13	-1.1	-2.2
Q	SYMBOLICS INC	6	4	4.20	+0.1	+2.8
N	TANDEM COMPUTERS INC	38	16	27.88	-1.0	-3.5
N	TANDY CORP	56	31	46.25	+0.8	+1.8
N	ULTIMATE CORP	30	13	28.88	+1.0	+3.6
N	UNISYS CORP	45	22	44.38	-85.0	-65.7
A	WANG LABS INC	19	11	16.50	-0.3	-1.5
Software & DP Services						
Q	ADVANCED COMP TECH	6	3	3.88	+0.3	+6.9
N	ADVANCED SYS INC	25	12	23.88	+0.6	+3.8
N	AGS COMPUTERS INC	22	8	19.88	+1.0	+5.3
Q	AMERICAN MGMT SYS INC	18	7	18.63	-0.5	-2.6
Q	AMERICAN SOFTWARE INC	22	7	15.50	-0.3	-1.6
N	ANACOMP INC	11	3	10.20	+0.6	+6.3
Q	ANALYSTS INTL CORP	8	3	8.00	+0.8	+10.3
Q	ASHTON TATE	30	11	23.13	+0.5	+2.5
Q	ASK COMPUTER SYS INC	17	10	13.88	+0.5	+3.7
Q	AUTODESK INC	285	9	25.00	+3.0	+13.6
N	AUTO DATA PROCESSING	51	29	47.13	-0.4	-0.8
Q	BOOLE & BABBAGE INC	12	4	11.00	+0.0	+0.0
N	COMPUTER ASSOC INTL INC	38	10	26.25	+2.1	+8.8
N	COMPUTER HORIZONS CORP	15	10	12.63	-0.6	-4.7
N	COMPUTER SCIENCES CORP	61	30	54.00	-1.8	-3.1
N	COMPUTER TASK GROUP INC	18	11	12.25	+0.5	+0.0
Q	COMSHARE INC	38	11	24.25	+0.3	+1.0
N	CULLINET SOFTWARE INC	13	6	11.88	-0.4	-3.1
Q	CYCARE SYS INC	12	7	8.25	+0.6	+7.2
Q	DUQUE SWE SYS INC	33	12	20.25	+1.3	+6.6
Q	ENDATA INC	12	5	8.88	+0.3	+2.6
N	GENERAL MTRS (CLS E)	45	24	43.00	+0.6	+1.5
Q	HOGAN SYS INC	17	8	13.38	-0.3	-1.8
Q	HYPERION CORP	25	7	18.20	+1.5	+2.8
Q	INTELLICORP INC	11	4	7.00	+0.0	+0.0
Q	KEANE INC	10	5	7.25	-0.8	-9.4
Q	LOTUS DEV CORP	37	8	20.00	-0.5	-1.8
Q	MANAGEMENT SCI AMER	21	11	12.00	+0.0	+0.0
Q	MICRO PRO INTL CORP	8	2	5.44	-0.1	-1.1
Q	MICROSOFT CORP	138	36	97.25	-2.0	-2.0
Q	NATIONAL DATA CORP	32	17	31.75	+4.9	+18.1
Q	ON LINE SOFTWARE INTL INC	20	8	18.88	+1.8	+10.5
Q	ORACLE SYS CORP	30	7	23.20	+2.8	+13.3
N	PANSOPHIC SYS INC	25	12	16.13	+0.1	+0.7
N	POLICY MGMT SYS CORP	30	16	23.50	+0.0	+0.0
Q	PROGRAMMING 4 SYS INC	13	8	11.25	+0.3	+2.3
Q	REYNOLDS & REYNOLDS CO	42	27	34.75	+1.8	+5.3
Q	SEI CORP	18	6	15.75	+0.0	+0.0
Q	SHARED MED SYS CORP	53	23	25.75	+0.4	+1.5
Q	SOFTWARE AG SYSTEMS INC	20	10	13.00	+0.5	+4.0
Q	SOFTWARE PUBG CORP	17	5	8.75	-0.5	-5.4
A	STERLING SOFTWARE INC	18	6	10.25	+0.4	+3.8
Q	SUNGARD DATA SYS INC	21	10	17.00	1.0	-5.6
Q	SYSTEMATICS INC	20	14	26.75	+0.5	+1.9
N	UCCEL CORP	45	16	43.88	+3.1	+7.7
N	URS CORP	21	13	17.88	-0.5	-3.4
Q	VM SOFTWARE INC	45	16	18.25	+0.8	+4.3
Semiconductors						
N	ADV MICRO DEVICES INC	39	15	18.13	+0.3	+1.4
N	AMALOG DEVICES INC	34	14	21.88	+0.4	+1.7
Q	AMALOGIC CORP	18	10	12.25	+0.3	+2.1
Q	INTEL CORP	61	18	86.88	-0.4	-0.8
Q	LSI LOGIC CORP	17	8	10.75	+0.1	+1.2
Q	MONOLITHIC MEMORIES INC	16	10	15.63	+0.4	+2.3
N	MOTOROLA INC	84	34	58.63	+1.9	+3.3
N	NATL SEMICONDUCTOR	17	8	13.63	+0.8	+5.8
N	TEXAS INSTRS INC	88	34	62.88	+3.1	+5.2
A	WESTERN DIGITAL CORP	33	12	27.75	+1.3	+4.7
Peripherals						
N	AM INTL INC	8	6	7.88	+0.3	+3.3
Q	8611 RESH INC	25	11	17.00	+2.0	+13.3
Q	AUTO TROL TECH CORP	8	8	6.50	+0.0	+0.0
Q	BANCTEC INC	16	6	12.63	+0.1	+1.0
Q	CIPHER DATA PRODS INC	18	6	6.63	-0.4	-3.8
A	COGNITRONICS CORP	5	2	3.88	+0.0	+0.0
N	COMPUGRAPHIC CORP	34	18	23.25	-0.3	-1.1
N	COMPUTERVISION CORP	23	11	14.50	-0.3	-3.3
N	CONRAC CORP	20	12	0.00	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	11.38	+0.3	+2.2
A	QATARAM CORP	10	7	7.13	-0.1	-1.7
N	DECISION INDS CORP	13	7	11.25	-0.8	-6.3
N	EASTMAN KODAK CO	88	52	95.25	+1.4	+1.5
Q	E M C CORP MASS	30	11	34.75	+1.0	+20.9
Q	EMULEX CORP	10	6	7.20	-0.1	-1.9
Q	EVANS & SUTHERLAND	40	20	30.75	+0.8	+2.5
Q	ICOT CORP	13	5	5.88	-0.3	-7.8
Q	INTERLEAF INC	20	8	15.63	-0.3	-1.8
Q	IOMEGA CORP	12	2	3.38	+0.3	+8.0
Q	LEE DATA CORP	10	5	5.25	+0.1	+2.4
Q	MASSTOR SYS CORP	8	2	4.63	-0.8	-15.0
Q	MAXTOR CORP	34	12	13.75	-0.4	-2.7
Q	MICROPOLIS CORP	44	14	35.63	+3.6	+11.3
Q	MINISCRIBE CORP	18	8	14.00	+1.3	+9.8
N	MINNESOTA MNG & MFG CO	75	50	73.88	+1.6	+2.2
A	MSI DATA CORP	18	10	19.00	+1.0	+5.6
Q	PRIAM CORP	8	2	3.38	-0.1	-3.6
Q	PRINTRONIX INC	14	10	10.38	-0.8	-6.7
N	QMS INC	22	11	18.25	-0.8	-3.9
Q	QUANTUM CORP	35	15	17.00	+0.0	+0.0
Q	RAMTEX CORP	6	4	5.56	+0.6	+11.3
N	RECOGNITION EQUIP INC	27	11	16.00	+0.4	+2.0
Q	REXON INC	14	5	8.38	+0.1	+1.4
Q	SCAN TRON CORP	17	11	12.75	+0.3	+2.0
Q	SEAGATE TECHNOLOGY	88	11	30.13	+3.1	+11.6
N	STORAGE TECH CORP	5	2	3.38	-0.3	-8.9
Q	TANDON CORP	7	2	4.50	-0.4	-7.7
A	TEC INC	7	3	9.00	-0.3	-4.8
N	TEKTRONIX INC	43	28	38.75	+1.3	+3.3
Q	TELEVIDEO SYS INC	3	2	2.56	+0.2	+7.8
N	TELEX CORP	102	63	84.63	-0.4	-0.6
Q	WYSE TECH	35	13	20.88	-0.5	-1.8
Q	XEROX CORP	81	61	73.25	-1.1	-1.5
Q	XIDEX CORP	20	11	13.25	+0.4	+2.8
Leasing Companies						
N	COMDISCO INC	33	15	28.25	-1.3	-4.2
N	CONTINENTAL INFO SYS	14	7	12.13	+1.8	+15.5
Q	PHOENIX AMERN INC	8	3	4.50	+0.3	+5.9
Q	SELECTERM INC	7	5	5.63	+0.0	+0.0
N	U S LEASING INTL	53	39	53.00	+0.4	+0.7

EXCH: N—NEW YORK; A—AMERICAN; Q—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 6 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Join the party

Tech issues push aside months of disfavor, host market rally

Two weeks ago, computer industry stocks missed the stock market's party of rising prices. Last week, they hosted it.

After a couple of months of disfavor, technology issues roared back into investors' portfolios, leading a market rally that propelled the Dow Jones industrial average up more than 27 points Thursday and sparked other market indicators to record levels as well.

Seven of the New York Stock Exchange's 15 most active stocks on Thursday were computer-related, and all were gainers. Star performers included the following: Tandem Computers, Inc., up 2 points to 29⅛; Hewlett-Packard Co., up 2¾ points to 65; and IBM, up 3⅛ points to 163.

Two less active stocks gained more than 8% in value. Computervision Corp. rose 1¼ points to 15¾, and Advanced Micro Devices, Inc. went up 1½ points to 19⅝.

Six technology issues on the Big Board hit their highs for the year on Thursday: Compaq Computer Corp. at 50⅜; AT&T at 33½; Unisys Corp. at 44⅛, its highest since a recent stock split; Uccel Corp. at 45; Anacomp, Inc. at 10¾; and Contel Corp. at 37⅛.

CLINTON WILDER

ADR greases DBMS's wheels

Claims up to 35% performance gain in new release of Datacom/DB

BY CHARLES BABCOCK
CW STAFF

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) last week announced a performance-oriented release of Datacom/DB, its relational-like data base management system, that it says is 25% to 35% more efficient in transaction processing than its predecessor.

In addition to performance improvements, Release 7.5 of the DBMS incorporates a 31-bit addressing mode so it can take advantage of the facilities of IBM's MVS/XA operating system. Release 7.5 operates above the 16M-byte line that constrains regular IBM MVS/SP users, and it takes advantage of the larger virtual memory above the line. The DBMS also frees up Common Storage Area memory, for which there is frequently contention in busy shops relying heavily on older, 24-bit applications running below the 16M-byte line.

Besides increasing transaction throughput, ADR spokesmen claimed, this release of Datacom/DB is able to trim CICS response time by 25% to 35% and cut CPU utilization by 10% to 15%.

The performance improvements stem from a faster set-selection optimizer that uses a proprietary statistical estimation technique to select access paths and automatically stay abreast of changes in data patterns and keys. The optimizer is rule-based and can make trade-off decisions on access paths when it encounters complex queries, ADR spokesmen said.

Delegates work load

Datacom/DB is capable of distributing the I/O work load across multiple processors, allowing it to exploit dyadic and quadratic processors for greater system throughput, ADR spokesmen said.

Release 7.5 is available immediately. It carries a price tag of $145,900 for IBM OS and MVS environments and $114,500 for DOS environments.

In addition, the Princeton-based mainframe software house last week announced added functionality in Release 2.4 of its Datadictionary. The upgraded package is said to allow dynamic cataloging to support data base prototyping with change control of rapidly executed versions. It also allows multiple test, production and history versions of data base definitions to be established, tested, used, archived and refreshed with integrity.

Datadictionary Release 2.4 is available immediately and priced at $39,600 for OS and MVS versions and $32,600 for DOS versions.

Users edgy over VAX price rise

Digital Equipment Corp. customers were receptive last week to the price reductions on the lower end of the VAX line but stressed that they need more information about the price increases enacted on many of DEC's other products.

"I would have expected [the price cuts], since the Microvax III is coming out," said Larry Johnson, manager of MIS at Interlake in Burr Ridge, Ill. Regarding the price increases of up to 5% on most other DEC equipment, Johnson said, "I'm going to have a long, serious talk with my DEC rep." He said he was leaning toward Fujitsu, Ltd. disk drives on the five or six VAX 8250 and 8350 systems he might buy.

"As long as they keep dropping the prices in that low-end range, it suits us fine," commented Richard Baldwin, director of data processing at the Alabama River Pulp Co. in Perdue Hill, Ala. Last week, Baldwin received an 8250 system and said he is looking forward to the announcement in the near future of the VAX 8400.

Another manager, who is in the process of purchasing several Microvax 2000 models, said the 17% to 20% price reductions on those machines were most welcome. Steven C. Sneider, who heads computer model development at Batelle Memorial Institute in Willowbrook, Ill., also greeted favorably the ability of 8000 series systems to attach directly to a local-area Vaxcluster, which he said will save him the $13,000 cost of a Unibus channel he would otherwise have needed.

However, Sneider was less pleased with DEC's price increases. "I think their software is too expensive as it is," he said.

Donald Kelch, an applications analyst at a Caterpillar, Inc. facility in Pontiac, Ill., said the throughput increase made possible by DEC's new 1M-bit chip memory technology is good news because he will be using his VAX in a memory-intensive graphics application.

DAVID BRIGHT and STANLEY GIBSON

Ashton-Tate tests publishing waters

BY STEPHEN JONES
CW STAFF

Ashton-Tate moved to carve out a niche for itself in the desktop publishing market last week, introducing a $295 package designed for professionals with limited needs in that area.

The Byline package is positioned as a kind of workingman's desktop publishing program that does not require the high-performance hardware associated with such pricey software as Aldus Corp.'s Pagemaker.

Byline is aimed at what Ashton-Tate called an untapped market of word processor users who want fancier output but do not need sophisticated publishing skills. "We're planting a flag in a market that has great opportunities for big volume success," said Ashton-Tate product manager Bill Jordan.

Byline, which is Ashton-Tate's first desktop publishing offering, is scheduled to ship to authorized Ashton-Tate dealers this quarter. Jordan said preview copies of the product will go out to about 160 Ashton-Tate customers this week.

Targets occasional users

The package is the latest in a series of low-end desktop publishing systems that are aimed at the pocketbooks of occasional desktop publishing users. Byline will fit in between Software Publishing Corp.'s PFS First Publisher, which sells for $99, and Digital Research, Inc.'s GEM Desk Publisher, which costs $395.

Designed to run on IBM Personal Computers and compatibles with 384K bytes of random-access memory (RAM), Byline uses low-level monochrome graphics capabilities and does not need a mouse. Most high-end desktop publishing systems, in contrast, require high-resolution color graphics, a mouse and at least 512K bytes of RAM.

Craig Cline, associate editor of the *Seybold Report on Desktop Publishing* in Malibu, Calif., said Byline is the first product of its kind to provide a data base publishing capability. The feature allows users to import Ashton-Tate's Dbase III Plus data bases into prestyled forms.

Byline also directly imports and exports files created by such word processor programs as Ashton-Tate's Multimate, Wordperfect Corp.'s Wordperfect and Micropro International Corp.'s Wordstar. It also imports files from Lotus Development Corp.'s 1-2-3 and Symphony.

Lacks friendliness factor

Cline said the package's weak point is that occasional users may not find it to be as user-friendly as other low-end programs.

Once a user develops the skills to master the product, Cline said Byline might not offer enough capabilities.

"Although it's not as difficult [to operate] as high-end products, Byline is still difficult enough to use that when people get up to speed on it, they'll reach a wall of limitation and get frustrated," he said.

DEC prices

FROM PAGE 1

crease system capacity and throughput, the ability to directly connect to local-area Vaxclusters and the ability to support up to four Ethernet connections. DEC also halved the footprint of 8530 and 8550 systems configured for Vaxclusters.

IBM's spasms

The restructuring is "not atypical, because IBM is going through the same spasms right now — a constant rebalancing of the price/performance levels at each point of the systems line," said Stephen Dube, an analyst at Shearson Lehman Brothers, Inc.

By being more aggressive at the low end, DEC is "creating in its own mind a position for a follow-on Microvax product," noted Infocorp analyst Sandra Gant.

The Microvax III is expected to offer at least double the performance of the Microvax II, which operates at about 0.9 million instructions per second (see story page 51). The system will differ from the larger, VAXBI-bus-based 8000 series machines in that it will retain the slower Q-bus.

The steepest increase was made on the 8550 system, which moved to $506,000 from $479,000 for a basic 32M-byte configuration. Prior to the March price restructuring, the price of the same configuration had been approximately $398,000.

The price of the VAX 8700, DEC's most powerful single-processor system, rose from $564,000 to $592,000 for a 48M-byte configuration, and the price of a dual-processor 8800 system with 64M bytes rose from $852,000 to $885,000.

Leading the VAX 8000 price reductions was the 8350, which dropped from $132,000 to $124,000 for a 32M-byte building block system. In March, DEC had reduced the 8350's price by as much as $19,000. The price of a 32M-byte 8530 system fell from $342,000 to $331,000, and the 8250 dropped from $96,000 to $92,000 for a 16M-byte configuration.

"None of the changes were very big," said Mark Roberts, corporate product operations manager at DEC. "What we did was just move some of the stuff around to make the line more consistent. We made the low end of the 8000 series a bit more competitive and enabled it to be expanded with more memory, which will make a lot of difference. The 16M-byte memories for the 8250 and the 8350 will give people a lot of performance. The larger systems being able to use a 64M-byte memory board will have a tremendous impact."

A marketing move?

Analysts noted that the changing of retail pricing is often no more than a marketing move and may not mean that much to large corporations that buy in volume. "The public announcement of price changes is really a marketing statement, as opposed to a real-world situation," Dube said.

Because DEC recently made software eligible for the company's standard discounts, most price increases on software would be negated, Roberts claimed. He said the only other products not impacted by the price hikes are the Vaxstation workstations and some recently announced servers.

However, DEC did not provide pricing information by press time on such products as disk drives, terminals and printers. John Rose, head of DEC's personal computing group, said he did not know of any price changes on the Vaxmate personal computer.

DEC claimed that use of the new surface-mount memory modules can increase system throughput by as much as 40%. The 16M-byte module expands the capacity of the 8250 and 8350 from 32M to 128M bytes, and the 64M-byte module doubles the capacity of the 8530, 8550, 8700 and 8800 systems to 256M bytes. Adding 64M bytes of memory now costs a customer $25,000, compared with $36,000 previously, Roberts said.

Software firms claim HP switch poses no risk

BY JEFFRY BEELER
CW STAFF

CUPERTINO, Calif. — Two suppliers of system utilities for the Hewlett-Packard Co. 3000 series said last week they have been able to convert their products to run on HP's commercial Precision Architecture processors with a minimum of code revisions.

Unison Software, Inc. in nearby Mountain View, Calif., and Los Angeles-based Vesoft, Inc. recounted their recent visits to HP's Software Evaluation and Migration Center (SEMC) here, where the companies successfully moved their packages to the machines.

When the HP 3000/930 and 3000/950 were announced in February 1986, much of the industry voiced serious doubts about whether such radical departures from conventional architectures could remain compatible with the rest of the company's minicomputers.

During a series of eight to 10 SEMC visits from May 1986 to last month, however, Unison successfully migrated four packages, totaling some 160,000 lines of code, according to Michael Casteel, Unison executive vice-president.

One of Unison's software products, a library package called Tapes, was ported to native mode, which allows the code to take full advantage of Precision Architecture's enhanced functions.

Two other utilities — a response-time measurement aid and a transaction processor — were moved to compatibility mode, which enables 3000-series programs to execute on the 930 and 950 without exploiting their expanded performance features. The fourth package, a batch job scheduler named Maestro, was split between compatibility and native modes.

In Tapes' case, the migration entailed little more than restoring the code to tape and recompiling it to run under Precision Architecture. Less than 1% of the package's 10,000 to 15,000 lines of source code had to be changed.

With Maestro, about three-fourths of its code, which was written in HP's proprietary SPL programming language, was simply restored and migrated to compatibility mode.

Like the bulk of Maestro and some of Unison's other products, Vesoft's MPEX/3000 productivity tool and Security/3000 utility were also written in SPL.

But even though the two software offerings were migrated only as far as compatibility mode, the company still felt the need to rewrite 2% to 3% of its 30,000 lines of code because of operating system-specific operations, according to Vesoft Vice-President Eugene Volokh.

Cincom President Yablonsky resigns

CINCINNATI — Cincom Systems, Inc. announced last week that company President Dennis Yablonsky, who has been with Cincom for 12 years, has resigned for personal reasons. Stepping back into the president's role will be Cincom founder and Chairman Thomas Nies, who had previously held the title.

"It is necessary for Dennis to relocate back to Pittsburgh, his hometown, to be close to his parents and family," Nies said in a prepared statement.

However, Yablonsky, 35, said he is leaving for a better position as president of the Carnegie Group, Inc., a $13 million artificial intelligence consulting firm. Carnegie employs 150 people.

"I will be responsible for all the strategic aspects of the company. I'll be the head coach now, and at Cincom, that wasn't possible," he said last week. Yablonsky will also own stock in the privately held Carnegie Group.

During the past two years, Yablonsky had emerged at Cincom as a strong spokesman for the company.

Yablonsky became president after emerging from marketing positions at the company. In addition, he oversaw the company's growth from $89 million in 1985 to a projected $120 million this year.

He was a key player in the firm's replacement of its aging Total data base management system with the relational Supra in the IBM mainframe world.

Mac attack

FROM PAGE 16

As a user of DEC and Apple equipment, Rodger Mansfield said he found Helix VMX an ideal departmental data base environment. Mansfield, a senior management systems analyst for the Valley Systems Division of General Dynamics Corp. said he used Helix on a Macintosh to develop a complex application in one weekend. Now he is implementing Helix VMX on a Microvax.

"We could have just used Helix for that project and gone on to a mainframe application, but when we saw it would solve a lot of our networking problems, we kept the Helix product," he said. Mansfield said he believes the DEC backing will make users more comfortable with the Helix product.

Another user agreed. "We had always been sold on the user interface of the Mac and decided to apply it to data bases. The VAX came into play as we charted out our growth curve because the VAX is easy to upgrade," said John Damico, general manager of Public Enterprises, Inc. in Rochester, N.Y.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (6 issues), April (5 issues), May (5 issues), June (6 issues), July (5 issues), August (6 issues), September (5 issues), October (5 issues), November (6 issues), December (4 issues) and a single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

Subscription rates: $2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.

MPA ABC ABP

POSTMASTER: Send Form 3579 (Change of Address) to *Computerworld*, Circulation Department, P.O. Box 1566, Neptune, NJ 07754-1566.

INSIDE LINES

Keep on keeping me waitin'. Don't count on IBM to rush its introductory version of MVS — MVS/IS. IBM executives reportedly told analysts at a recent gathering in Dallas that MVS/IS will be available in 1990. The prepackaging is being coordinated by IBM groups in Poughkeepsie, N.Y., and Boblingen, West Germany.

This ever happen with Mitch in charge? Users of Lotus's 1-2-3 Release 2.0 are still waiting for Learn and Speedup, two add-in enhancements for which a March delivery was promised. Sources at Lotus said the company's software developers are having trouble writing the Speedup recalculation feature because it taps directly into the actual code of 1-2-3. Meanwhile, Learn is ready and waiting for Speedup to live up to its name. Anybody out there still waiting for Networker?

The short and the long of it. Novell Netware users can expect shipment of Version 2.1 next month, and our friendly users group tells us OS/2 support will follow by year's end. But (there's always a but), Novell has confirmed reports that shipment of two gateway products, X.25 and the Netware Asynchronous Communications Service, announced at Comdex/Spring '87, will be delayed. No explanation was available.

As the world turns. Joint marketing agreements between minisupercomputer and technical workstation vendors have become quite commonplace of late. The most recent, expected to be disclosed at a New York press briefing today, pairs fledgling minisupercomputer maker Multiflow Computer, Inc. with Apollo. Apollo is an investor in Multiflow but also has a joint marketing relationship with another minisuper vendor, Alliant. Alliant, meanwhile, has a relationship with Sun.

Trading places. IBM has shifted responsibility for the development of its RT PC 32-bit Unix processor from the Industry Systems Products Group to the Entry Systems Division in Boca Raton, Fla. "This will provide a single development focus on technical and intelligent workstations," an IBM spokeswoman said last week. It also means that the RT PC will be refocused to reach a broader market. "We are targeting the Unix marketplace," said Merry Quackenbush, director of media industry and publishing systems.

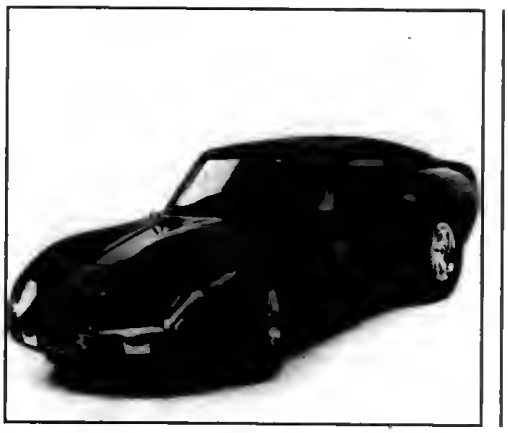
It's a small world after all. Hewlett-Packard is reportedly preparing to release two microcomputers this fall based on the Intel 80286 and 80386 chips. The desktop machines supposedly offer the option to have both a 5¼- and a 3½-in. floppy disk drive built in. A lot of users have been grumbling about the conversion process since IBM released its PS/2 series with microfloppy drives.

Reaching for the top. Pansophic wants executives to be able to query its Easytrieve Plus data bases as easily as programmers do. To that end, the Oak Brook, Ill., firm is planning to announce this fall a natural language interface to the company's Easytrieve Plus data retrieval system. Easytrieve Plus NL "will be an English-language product that creates mainframe queries from a personal computer," said Joan Fee, manager of Pansophic's Personal Computer Products group.

Best of the batch. Software Publishing will usher in a new wave of desktop publishing with the release of a package that includes a built-in full-featured word processor. Other desktop publishing packages require word processor files to be imported, often through MS-DOS batch files that befuddle novice users.

OK, just one more late notice. Apple has been forced to revise delivery dates of A/UX, a version of Unix compatible with AT&T Unix System V and the University of California at Berkeley Unix 4.2. Co-developed by Unisoft and Apple, A/UX has been tripped up by performance problems and won't meet its July schedule, sources say. Unisoft delivered the basic product to Apple, which has been trying to graft its icon-based user interface to A/UX.

MORE THAN JUST THE BASIC NECESSITIES.



KEYFAST®

ONLINE · DATA · ENTRY

THE MOST INSTALLED ONLINE DATA ENTRY SYSTEM WORLDWIDE

Speed. Power. Performance. These are the Formula I qualities that put KEYFAST, the CICS Data Entry System, miles ahead of the rest. For fast, accurate data entry and processing, our customers know that KEYFAST can't be beaten. Just take a look at this winning formula: 1. Ease of use: any user can paint complex formats and entry rules online. Menus, Help Screens with notepads, and messages guide the user. KEYFAST is easy to install and can be used immediately. 2. Powerful entry/processing routines: automatic field duplication, shorthand, totals and mathematical functions for data management; extensive batch processing; data extract on any storage media; select, duplicate, modify, extend or reformat records. 3. Flexible verify and checking functions: alphanumeric, numeric, binary, packed and entry/verify fields, range checks, table lookup; search, mass change, select, merge, copy and sort functions. 4. Powerful and time-saving features: the Data Dictionary makes many user exits unnecessary. The LANGUAGE, H&M's end user programming language, enables users to define special field validations. 5. Security at its best: for applications, tasks, functions and batches.

H&M. SOFTWARE'S FUTURE

H&M Systems Software, Inc., 25 E. Spring Valley Avenue
Maywood, N.J. 07607-9982, Phone: 1-(201) 845-3357
TOLL FREE: 1-(800) FOR DEMO

KEY87-4US

MAIL FOR MORE INFORMATION

Name

Company

Department

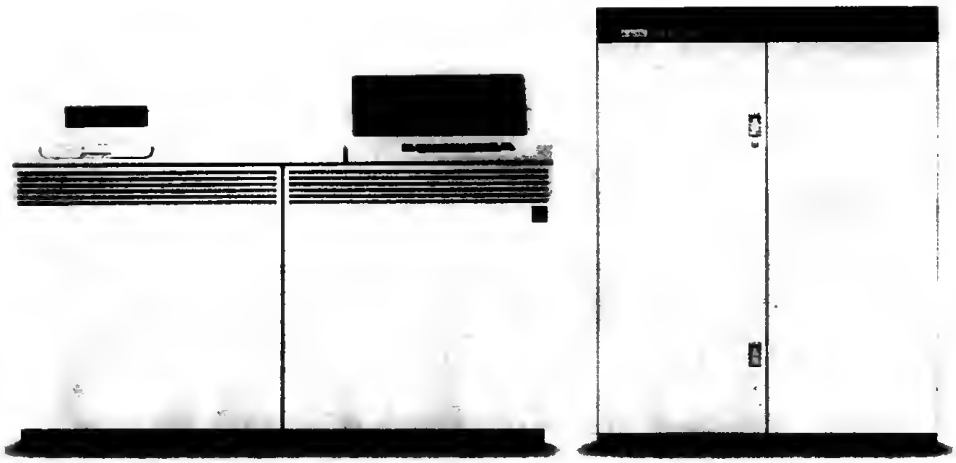
Phone

Street

City, State, Zip

CPU Op System

H&M Systems Software, Inc., 25 E. Spring Valley Ave.
Maywood, N.J. 07607-9982, Phone 1-(201) 845-3357



EIGHT YEARS AGO, WE SAW THAT THEIR POTENTIAL WAS ANYTHING BUT MINI.

Today everyone's on the minicomputer bandwagon. But the mini wasn't always fashionable.

Eight years ago, we were a lonely voice in the crowd. Quietly developing the financial software, service and support for the day when minicomputers would become a major force in the corporate flow of business information.

Now that day is here. It seems like it happened almost overnight.

But for the benefit of those minicomputer users who are presently evaluating software vendors, we'd like to point out a few things that didn't happen overnight. Good things people automatically enjoy when they do business with McCormack & Dodge.

Our minicomputer products have stood the test of time. All over the world, they've shown they can deliver the same outstanding results as M&D mainframe software.

What's more, our systems are supported worldwide by top minicomputer professionals – seasoned application, technical, and training specialists.

And good as our products are, they perpetually get better. Enhancements flow regularly from a long-established R&D program, generously funded through Dun & Bradstreet resources.

With all the good hardware available, choosing your brand of minicomputer may be difficult.

Fortunately, your software choice is a whole lot easier.

McCormack & Dodge

a company of The Dun & Bradstreet Corporation

Financial, human resource, manufacturing, and application development software for multiple computing environments. Call 1-800-343-0325.